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ABSTRACT

This booklet is a resume consisting chiefly of extracts from papers that were presented at a conference on Human Conservation in Central America, held in Guatemala in 1965, as well as from discussions that took place during the conferences. With cooperation of numerous organizations and guidance from the Conservation Foundation, a discussion of problems relating to conditions of human existence in Central America was concluded. Based on the principal point of view that the problems faced in Central America are dynamic and their importance transcends local significance, an attempt was made to evaluate the problems within the scope of the next 25 years. Multiple factors were considered including the complex social structure, geographic variations, economic organization, levels of education, availability of resources, and broad diversification in the field of agriculture. Several statistics and graphs are used to illustrate the economics and agricultural conditions of the region. (BL)

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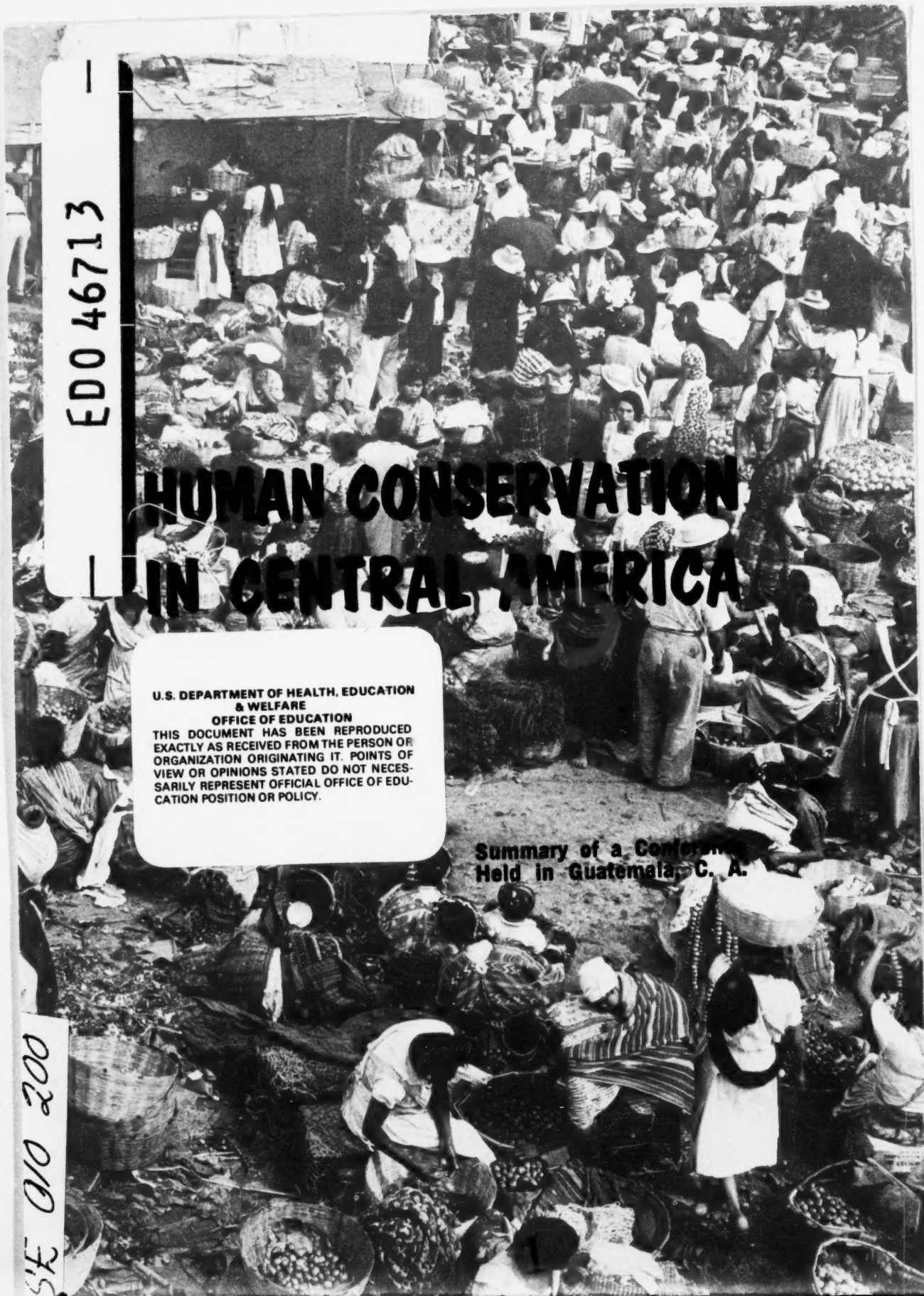

HUMAN CONSERVATION IN CENTRAL AMERICA

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Summary of a Conference
Held in Guatemala, C. A.

SE 010 200

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HUMAN CONSERVATION IN CENTRAL AMERICA

Summary of a Conference
Held in Guatemala, C. A.

PROLOGUE

"The events of the last decade in the fields of world politics and economics have combined to give a new thrust to the determination to accelerate economic and social development of our countries. There is general agreement that underdevelopment is the major problem confronting the present generation and that its solution not only is possible but also imperative, if we wish to preserve world peace and, consequently, civilization . . .

"The basic problem of the developing countries is shared: how to combine the human and natural resources at their disposal in such a way as to provide a fulcrum that may lift their economic and social development to the level of industrialized nations.

"Probably one of the major advances that has been achieved in the last decade is the universal recognition that the principal element in advancing the progress of developing countries is their store of human resources.

"There exists, then, a recognition of the vital importance of the utilization of the human element in the process of development. This is a good beginning. But the time has come to sound the tocsin to bring together the will and effort directed toward a definite program of development and conservation of natural resources -- the environment on which the human being has to depend for his maintenance. Herein, precisely, lies the transcendent importance of this meeting."

Manuel Noriega Morales

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INTRODUCTION

The populations of Central America -- the five countries that have organized their efforts within the Central American Common Market -- are perhaps the most rapidly growing in the world. In general, they are considered "underdeveloped" and have low living standards.

However, the evidence indicates that the living standards of the majority of the people are improving, although slowly. On the other hand, it is a recognized fact that much of the land on which the Central Americans depend for their sustenance, as well as for the commercial agriculture on which they base a large part of their industrialization, is losing its productive capacity at an alarming rate. Furthermore, the hydrologic cycle governing a great part of the water resources is suffering grave disorganization.

Many integral parts of the Central American geographical, cultural and economic processes are interrelated and interdependent. Changes that affect any one of them are reflected in the overall structure of society much as a thread that is broken affects the web of a fabric. Equally, the strengthening of one of these processes may reinforce other related processes.

Of course many other underdeveloped regions of the globe exist in similar conditions, although generally in a somewhat less dynamic form. Nevertheless, the situation is different in Central America and very encouraging because its inhabitants, or at least its ruling groups, are themselves adopting measures to improve conditions. For example, they are developing a certain degree of cooperation, especially in the economic sphere, that recognizes the limitations imposed by populations that are relatively small and "Balkanized". It would be hopeless for a country like Nicaragua, whose population is only 1.7 million people, or Costa Rica, with 1.4 million, to achieve full industrialization alone, or to build up a market for manufactured products capable of raising the standard of living. The five countries together, with a population of 12.7 millions -- far larger than that of Denmark, Norway or

Sweden -- obviously have greater potentials. It is for this reason that the cooperative spirit that has pushed these nations toward an integrated economy, as well as toward partnership in other fields of considerable future importance, offers such favorable prospects.

The Conservation Foundation has always had as a primary interest the availability of a healthy environment and productive lands for the development of healthy populations. For a considerable time it has maintained a concern with events in Latin America, as the soil erosion map of Mexico, Central and South America, that this Foundation published in 1954 in cooperation with the Food and Agricultural Organization of the United Nations (FAO), testifies.

Moved by these combined interests, and after a brief reconnaissance on the land itself in 1963-1964, the Foundation decided on Central America as the best place to begin investigations designed to cast light upon the conditions of human existence in this region.

The decision was based on this principal point of view: the problems that must be faced in Central America are dynamic and, for this reason, their importance transcends local significance; in one way or another they must also be faced in tropical Africa, Asia and, especially, Southeast Asia. Although the Republic of Panama has not yet become a part of the Common Market, it was at times included in these discussions because it provided some of the best available information. Official figures used in various papers presented at the conference have contained data from this country.

The horizon of the study was fixed at approximately 25 years, recognizing that few crystal balls maintain their clarity longer than this. Furthermore, events take place so rapidly in Central America that only vigorous and effective actions could keep up with the changes.

Not only are satisfactory solutions not being reached; many of the more important problems have not even been considered. For example, almost no attention is given to, nor is there

a significant interest in making investments in, the protection of watersheds or waterfalls of enormous importance as potential sources of hydroelectric power despite the fact that such measures might at the same time control floods, protect sub-surface waters and prevent the siltation of rivers. Current development may be resulting in a deformed structure that affects both human beings and the environment in which they must live, a deterioration which physicians and embryologists call "teratology".

It was considered important to pose significant questions from which significant answers might be derived. Thus at no time were there asked such questions as: "Is it possible to increase agricultural production?", but rather, "Is it possible to increase the production of those specific elements that every man needs to enjoy an adequate subsistence level?"

Obviously a question of this kind cannot be answered easily, since it involves multiple factors such as the complex social structure, geographic variations, economic organization, levels of education, availability of resources and broad diversification in the field of agriculture.

The Institute of Nutrition of Central America and Panama (INCAP) offered its generous hospitality for the interdisciplinary meeting held to discuss these problems. It was considered desirable to begin with a real experience at the "process level" -- that is, on the land itself where these things are happening -- instead of at the verbal level where such events are merely talked and written about. Amigos de la Tierra (Friends of the Land), an organization that has been concerned for nearly two decades with soil conservation in El Salvador, kindly took on the responsibility of organizing a two-day field trip in that country. The Permanent Secretariat of the General Treaty of Central American Economic Integration (SIECA), the Interamerican Institute of Agricultural Sciences of the Organization of American States (IICA), INCAP and the Central American Institute of Research and Industrial Technology (ICAITI), along with The Conservation Foundation, a private organization headquartered in Washington, D. C., formed the Organizing Committee. This group at

all times counted on the valuable expertise of the Superior University Council of Central America (CSUCA).

From the outset it was agreed that the members of the Organizing Committee, as well as other participants in the Conference, should act as individual citizens and that whatever points of view were expressed by them in no sense necessarily represented policies of organizations with which they were associated. It was further agreed that the conclusions of the Conference would not necessarily imply a unanimity of opinion although it was hoped that a general consensus would be achieved. This consensus was arrived at, fortunately, but it should be borne in mind that none of the opinions or concepts in the text of this Conference report represents the point of view of all the participants.

The Organizing Committee held two preliminary meetings at INCAP, in October 1964 and January 1965, and a final meeting in El Salvador in October 1965. Invitations were distributed well in advance and those people named on the list of participants prepared a variety of papers that were circulated before the Conference; at the meeting only resumés were presented. One hour and twenty minutes was devoted to the discussion of each work.

The meeting opened in the capital city of San Salvador with a banquet, with his Excellency, the Minister of Agriculture of El Salvador, Ingeniero René David Escalante Orozco, attending. He also joined in the following field trips. The Director of ICAITI, Dr. Manuel Noriega Morales, opened the Conference with an especially pertinent speech that clearly defined limits for the studies and discussions of the seven subsequent days.

Early in the morning of the 9th of October, 1965, the participants, some observers and members of Amigos de la Tierra boarded small airplanes put at their disposal for observation of good and bad land use and the condition of the Salvadorean countryside. They flew over the area between the volcanic zone and the coast. This gave an opportunity to get an idea of the occupancy of relatively isolated lands, as well as those along roads and highways. After landing at the private

airstrip of Sr. Juan Wright, President of Amigos de la Tierra, the trip was continued by automobile another sixty kilometers east, to see the invasion of the arid rocky areas by land-hungry peasants.

The trip ended with a picnic lunch offered by Sr. Wright at his Finca La Carrera, after which some members of the group returned to San Salvador by airplane and others by car.

The following day the return trip to the City of Guatemala was made by land, and along the 275 kilometers of highway the participants could observe some of the pressures on the land resulting from the excessive demographic growth, in this most densely populated country of the American continent, as well as a diversity of land use, good as well as bad.

Luncheon on the shore of the Lago de Coatepeque, as guests of Amigos de la Tierra, provided a pleasant break. This also gave a chance to see how the rising level of the lake -- produced entirely by siltation resulting from soil erosion -- was threatening with inundation the residences built around the shores.

The intensive discussion of the development of Central America, and the many-faceted aspects of the problem referred to in the text of this report, began the following day at INCAP, the seat of the Conference.

Unfortunately, because of unexpected last-minute circumstances, the sociologist who should have participated in the discussions could not be present. Without question, many of the geographic, economic and cultural changes that must take place in the course of the next 25 years in Central America, as a result of economic and population growth, will require profound social adjustments and indispensable modifications of land use practices among the small farmers. These must depend on new motivations based on customs and values and it is obvious that sociologists and anthropologists should have a very important part to play in the process. This was recognized by the Conference and the participants were at all times aware of the importance of this factor, despite the absence of an expert in sociology.

Before ending this Introduction, it should be noted that the Central American statistics cited principally from official sources, like those in the greater part of the world, should be carefully scrutinized since in many cases the raw data constitute mere approximations. Nevertheless, if a country estimates that 70% of its people are illiterate, and that within 20 years its population will double, it is evident that even should these figures be 25% wrong, the nation is facing very serious problems.

Another grave defect from which Central American statistics suffer, along with those of the United Nations and other countries, is the excessive dependence on the arithmetic mean. It is possible that in Central America the per capita income -- as claimed -- may be $242 Central American pesos (on a par with the dollar). But when a report of the Agricultural Sub-Committee of SIECA reveals that 7.5 millions -- or about 64% of the people -- have an average income of 12¢ a day, the comparison between these extremely low incomes and the figure of $242 suggests taking the average income of a millionaire and his chauffeur. In comparative terms it is perhaps significant to recognize that the estimated income in Central America is only two-thirds of the "average" of the people of India.

A final warning is perhaps pertinent, relating to another common statistic: the number of people per square kilometer. This can be useful for those who are planning the development of a city, but when it is applied to an entire nation, it is completely lacking in significance unless one knows the type of people under discussion and the type of land (slope, productivity, etc.). The skill of the farmers who use the land, which ranges from that of the agricultural engineer to that of the illiterate peasant, will make almost as much difference as the hills and slopes that in some cases reach 100%, and soils that vary from relatively modern volcanic soils to laterites. Obviously, the productive capacity of the Sahara is completely different from that of the Argentine pampas.

The present Resumé consists chiefly of extracts from papers that were presented at the Conference, as well as from

discussions that took place during it. The synthesis was an extremely difficult task, since it was impossible to avoid omitting important and valuable material. The extracts from the papers are not always presented in the order in which they were read nor have they necessarily been grouped by author. Furthermore, so as to give clarity to the text and avoid repetitions, in some cases it was necessary to alter even the order of paragraphs. Nevertheless, the editor hopes that he has been able to catch fairly the diverse points of view expressed during the meeting. He accepts full responsibility for whatever errors may have arisen in the editorial work. He hopes, furthermore, that the complete papers, as well as part of the interesting discussions that they stimulated, may be published at not too remote a date.

ACKNOWLEDGEMENTS

The meeting of the Study Group on Human Conservation was a completely cooperative project. Although The Conservation Foundation took the initiative and secured the necessary funds, the structure of the Conference itself was the work of the Organizing Committee and the participants freely contributed their time, opinions and knowledge in their respective fields. All those who took part in this interdisciplinary experiment agreed that it was a very stimulating educational experience.

The Conservation Foundation wishes to express its very sincere thanks to all the institutions that collaborated by permitting their members to devote the time required for the planning of this meeting, as well as for their participation in it. Particular mention should be made of INCAP, the organization that served as headquarters for the meeting, and Amigos de la Tierra, which organized and provided the necessary air and ground transport for the field trips.

The undersigned especially desires to express his thanks to the other members of the Organizing Committee, above all to Dr. Moisés Béhar and to Dr. Manuel Noriega Morales, who turned what might have been emergencies into an efficiently functioning machinery.

Most especially, thanks are due the late Mrs. Alan M. Scaife, whose generous gift made the Conference possible.

I am also especially grateful for the valuable help of Ingenieros Mario Pacheco Araujo and Guillermo Menéndez, who were responsible for the organization of the banquet and the field trip in El Salvador. Finally, special thanks are owed to Sra. Leonora G. de Randa, member of the INCAP staff, whose backstage activities during the meeting required great dedication and hard work; and to Sra. Amalia G. de Ramirez, who gave most invaluable help with editing the Spanish language Resumé.

William Vogt
Secretary
The Conservation Foundation

C E N T R A L A M E R I C A - P O P U L A T I O N

The Present - The Next 25 Years

POPULATION

The problem of accelerated population growth is affecting almost all countries, especially those that are, well or badly, labeled "underdeveloped"; often one may use this growth rate as an index of the extent to which they are underdeveloped. The European countries, through transformations that took place largely in the past century, more or less spontaneously adjusted their birth rates to changing death rates, changes that arose as a consequence of progress in the field of sanitation and medicine at the beginning of the latter half of the century. This adjustment (including much emigration) permitted these nations to grow at a relatively slow rate and has made possible and fostered their enormous technological and economic progress.

But this is not the case with the Central American countries in which a sharply falling death rate, in contrast to a high and practically stable birth rate, has created rates of growth that exceed 3% a year -- almost never before encountered by humanity -- which will lead the population of these countries to double themselves in a little more than 20 years.

If we contemplate the future we must start from the principle, often forgotten, that the needs of tomorrow's population will be in great part determined by the population that now exists. Unhappily this problem, for the most part not understood, typically results in passions and prejudices that prevent objective consideration.

It is currently estimated that in mid-1965 the population of Central America reached about 12.7 million inhabitants distributed over an area of 441,070 square kilometers (Table No. 1) with a mean density of 29 people per square kilometer.

This statistic of overall density of population does not give a clear idea of the demographic pressure on the natural resources, especially on the land. The mountainous character of these countries, associated with the variety of climates, soils and other factors, makes it impossible to compare large areas soundly.

TABLE NO. 1

Population of Central America and its density by country in 1950 and 1965

Country	Area (Km^2)	1950		1965	
		Population (1,000)	Density (Inhab/ sq.km)	Population (1,000)	Density (Inhab/ sq.km)
Central America	441,070	7,962	18	12,693	29
Guatemala	108,889	2,805	26	4,432	40
El Salvador	21,393	1,868	93	2,920	137
Honduras	112,088	1,428	13	2,206	20
Nicaragua	148,000	1,060	7	1,687	11
Costa Rica	50,700	801	16	1,448	29

A more careful calculation of these densities reduces the contrast between the raw data that appear in Table No. 1. Actually, as shown in the detailed figures of Table No. 2, the comparative densities of Guatemala and El Salvador are very similar.

TABLE NO. 2

Country	Inhabitants per square kilometer of cultivated land (plowland, permanent cultivation, pastures, grasslands)
Guatemala	135.9
El Salvador	148.6
Honduras	79.6
Nicaragua	88.1
Costa Rica	81.7

Another important aspect of population distribution is where a person lives. In the last century, when the city was very different from the countryside, there developed in demographic analysis the urban-rural dichotomy. Today, at least in places near centers of large population concentrations, the relationships between the city and the countryside are less well marked and the advance in modern methods of communication and transportation diminish the differences between the place where one lives and that in which one works. Thus, as a transition between what was traditionally considered as urban and rural, the suburban zone has come into being. This dichotomy, although apparently simple, is not easy to establish in the process of taking censuses. The only convenient criterion to apply is to accept as urban those concentrations of population whose number of inhabitants exceeds a certain limit, a limit that has been progressively increasing for purposes of international comparison, and that recently (Table No. 3) has been fixed at 20,000.

TABLE NO. 3

The total population, and that in towns of 20,000 or more inhabitants, in accordance with the most recent census.

(in thousands of inhabitants)

Country	Population			
	Total	%	Urban	
			Total	%
Guatemala	4,284	100	665	15.5
El Salvador	2,511	100	444	17.7
Honduras	1,885	100	218	11.6
Nicaragua	1,524	100	341	22.8
Costa Rica	1,336	100	318	26.8

The proportion of rural population (essentially farming and stock raising) in Central America is still high. But a headlong growth of the principal cities is taking place as a result of growing movement from the country.

The annual growth index for Central America increased by one percent from the decade 1940-1950 to the period 1950-1965 (Table No. 4). The most striking change is shown by Costa Rica, the population of which has grown in recent years about 4% annually. At an increase rate of 2.2% the population of an area will double in about 33 years, whereas at the 3.2% rate of the last 15 years it will take hardly 21 years to double -- a period which would be further reduced to 17 years if the index that now characterizes Costa Rica (3.9%) should prevail.

The use of the two extreme rates - 2.2% and 3.9% - shows the broad limits between which the future population must fall, as it is set forth in Table No. 5. In the year 2000 the population of Central America will be about three or four times that of 1960; unless there are early changes in the rates of growth, there are strong possibilities that the total will be closer to the latter figure.

TABLE NO. 4

The populations of the countries of Central America in 1940, 1950 and 1965, at the last census, and annual increase rate.

Country	1940	1950	1965	Last Census	Annual Rates of Increase	
					1940-1950	1950-1965
Central America	6,425	7,962	12,693	--	2.2	3.2
Guatemala	2,202	2,805	4,432	4,278	2.4	3.1
El Salvador	1,633	1,868	2,920	2,511	1.4	2.9
Honduras	1,146	1,428	2,206	1,885	2.2	2.9
Nicaragua	825	1,060	1,687	1,524	2.5	3.1
Costa Rica	619	801	1,448	1,336	2.5	3.9

TABLE NO. 5

Estimates of population by country in Central America

in the decades 1960-2000

(in millions of people)

Country	1960	1965	1970		1980		1990		2000	
			High	Low	High	Low	High	Low	High	Low
Central America	10.8	12.7	14.9	14.7	21.1	19.9	30.7	26.3	44.8	33.4
Guatemala	3.8	4.4	5.3	5.2	7.5	7.0	10.8	9.3	15.9	11.8
El Salvador	2.5	2.9	3.4	3.3	4.8	4.5	7.0	6.0	10.2	7.6
Honduras	1.8	2.2	2.5	2.5	3.6	3.4	5.2	4.5	7.7	5.7
Nicaragua	1.5	1.7	2.0	2.0	2.9	2.7	4.2	3.6	6.2	4.6
Costa Rica	1.2	1.4	1.6	1.6	2.3	2.2	3.4	2.9	5.0	3.7

By 1980, whichever hypothesis is used, the population will be about double that existing in 1960. During the present decade the population would increase about 38%, and during the subsequent decades by 42%, 46% and 47%, respectively, increases that would be considered very high.

As underdeveloped countries, those in Central America present the common characteristic of a bad distribution of national income. In El Salvador, for example (according to data elaborated by UNESCO in "Economic Development and Education in Latin America"), the national income is distributed in this way: 7.9% of the families receive 51.3%; in the middle sector, 31.2% of the families get 29.2% and the rest of the income, 19.5%, is distributed among the remaining 60.9%. Obviously, this inequitable distribution is not favorable for the conservation or development of the human sector in Central America.

As a result of this distribution, there is a general predominance of poverty. The income of a substantial part of the population is less than $100 a year, and of course its purchasing power is very low. The situation is complicated even more by the existence of cultural factors that channel consumption toward the satisfaction of "necessities" that are not primary. For example, in towns one need only cite the expenses that people incur in going to the movies or sporting events, in buying a transistor radio, or expenditures of the feminine sex in beauty salons; in the rural areas on the other hand, there is conspicuous consumption, to use Veblen's phrase, which uses up the scarce resources of the peasants in expenditures imposed by the leaders of religious fraternities.

Nevertheless, the general experience of the recent past seems to have been favorable as far as the increase of national income is concerned, both in total and per capita terms. Despite this increase, the basic situation has not notably improved since the larger part of the income has been concentrated in the urban population, and it is possible that, as has happened in Guatemala, the per capita income of the rural population of the rest of Central America has decreased, while slight increases have been concentrated in a limited

part of the population associated with large industries or in the production of agricultural exports. In other words, the overall and per capita increases in income do not represent a true increase in the general standard of living.

THE NUTRITION OF THE PEOPLE

A fact not revealed by statistics on causes of death and also concealed in the data on morbidity, is that malnutrition is the most important public health problem in Central American life.

It is possible that man can satisfy the biological demands of hunger without adequately meeting the nutritional requirements that maintenance of health demands. In the present epoch, hunger is becoming worse in large population groups, though it is not a social problem except in very special circumstances.

However, if the situation that prevails at present, and the tendencies that have manifested themselves in recent years continue in terms of population growth and use and availability of resources, it is not at all unlikely that within a very short time we will have to face up to new problems of hunger so grave that they will affect great sectors of the population of the area.

Protein deficiency, not only in quantitative but also in qualitative terms, related to the minimum necessities of the population, is without question the gravest and most widespread nutritional problem confronting Central America, a problem that is also present in other regions with similar ecological conditions.

This deficiency, usually encountered along with a varying degree of lack of calories and other essential nutrients, is the factor responsible for the high rates of morbidity and mortality that are observed particularly among small children. Also due to this factor is the rather frequent existence of severe forms of malnutrition, of inadequate growth and development of children, and of a reduction in capacity and efficiency of work and resistance to conditions of "stress" in the adult population.

Of special interest in this connection are certain recent studies -- which the Nutritional Institute of Central America

and Panama is trying to confirm -- suggesting that the mental development of these children follows a pattern similar to their physical growth.

In a recent study carried out by the Department of Nutrition of the General Office of Public Health, in the General Hospital of Guatemala City, it was established that about 80% of all children hospitalized in the Pediatric Services suffered from malnutrition.

Endemic goiter, resulting from a lack of iodine in the food, was one of the first conditions that the early INCAP studies uncovered as a serious nutritional problem. It was found that the average incidence of endemic goiter in the six member countries of the Institute, expressed in percentage of population, was as follows: Costa Rica, 16; El Salvador, 30; Guatemala, 38; Honduras, 23; Nicaragua, 28; and Panama, 32. These figures represent averages for each country but would include certain regions in which the prevalence of endemic goiter is really alarming, reaching as high as 80% or 90%.

It has been observed that when this condition exists in endemic form there is associated with it a high prevalence of deafness and dumbness, and congenital cretinism, and that furthermore it reduces the general vitality of the population. The need for iodine can be met by including it in common salt. This practice has been followed in Guatemala since 1960, in a form that is adequate and accords with the recommendations of INCAP. As a result, the 38% incidence of goiter has been rapidly reduced and the last figure obtained in 1965 through an investigation carried out in representative areas in the entire country was 5%, an indication that the problem is now controlled and that within a very short time endemic goiter will have disappeared from Guatemala.

Unfortunately, up to now it has been impossible to organize an effective program of iodinization of salt in any of the other countries of the Isthmus, although in view of the favorable experience in Guatemala all of them are making great efforts to apply this measure.

Vitamin A deficiency is another nutritional problem in this part of Central America. It is not possible to evaluate with precision the effects of such a deficiency, when it is not pronounced, but in some regions it is so severe, especially among young children, that it produces total destruction of the cornea, with complete and definite blindness from a very early age.

The availability of food has a vital importance from the nutritional point of view, of course, and the scarcity of proteins that the Central American area suffers is of particular interest. It has been estimated that the available food in the region includes a total of about 56 grams of protein per person per day, but of this total about 40 grams are of vegetable origin and the other 16 are of animal. The total figure satisfies the estimate of the minimum quantity to satisfy nutritional necessities in the population, that is, 56 grams per person per day. Nevertheless, the quantity of available protein that is nutritionally utilizable, corrected for its biological value, is only about 34 grams per person per day. The problem, in other words, is one of quality and not of quantity.

The cost of an adequate minimum diet for a Guatemalan family composed of six members, 2 adults and 4 children (one nursing, one pre-school, one in school and one adolescent), a number that approximates the familiar average structure, has been estimated. The diet was calculated to meet nutritional requirements, using to the maximum the foods of major availability and least cost in relation to their nutritional value. Also, eating habits, which are not easy to change, were taken into consideration, using only minimum indispensable quantities of food that are expensive and locally scarce. This cost is around Q. 2.00 (two quetzales)* daily per family.

Although the availability of food is one of the principal factors determining the diet pattern of the community or family, the choice among available foods is also conditioned by economic factors and, almost as importantly, by eating

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* Quetzal is the Guatemalan monetary unit, on a par with the dollar.

habits. Since the negative relationship between diet and health, or the association between food and sickness, is better established than the positive, many foods and combinations of food arouse fears and are avoided under given circumstances according to age, sex, physiological state or presence of sickness, real or supposed. This is particularly serious because it is the small children, as Figure 1 illustrates, who most suffer deficiencies in their diet aside from what would be expected because of the economic situations of their families.

If it is true, as has been said, that the availability of foods is of primary importance since it can well be the factor that can be changed in a relatively short time, it deserves further consideration. Total agricultural production in Central America and Panama, during the last ten years, has followed a favorable curve. Using the combined crops of 1952-1953 and 1954-1955 as base (100%), the index of per capita agricultural production in the region reached 134 by the crop of 1964-1965. The total improvement in terms of absolute agricultural production was, of course, even greater, but for the purposes of this analysis the index has been adjusted so as to allow for the growth of population. In other words, the total agricultural production has outstripped the growth of population.

However, from the point of view of nutrition, it is lamentable that the production of food in the region has not followed the same curve. Utilizing the same period of 1952-1953 and 1954-1955 as an equivalent base (100%), the production of foodstuff per capita in the region declined during these 10 years, giving an index of 98 for the crop of 1964-1965. These divergent tendencies between total agricultural production and food production are shown in Figure No. 2.

This is understandable when one considers the emphasis that has been placed on crops of economic interest such as cotton, to the detriment of traditional food crops. As Figure No. 3 shows, this tendency has been even more dramatic in the case of El Salvador.

FIGURE 1

ADEQUACY OF CONSUMPTION OF NUTRIENTS, PER CAPITA, STATED IN PER CENT OF RECOMMENDED QUANTITIES, BY FAMILY AND BY PRE-SCHOOL CHILDREN, IN A RURAL INDIAN COMMUNITY IN GUATEMALA.

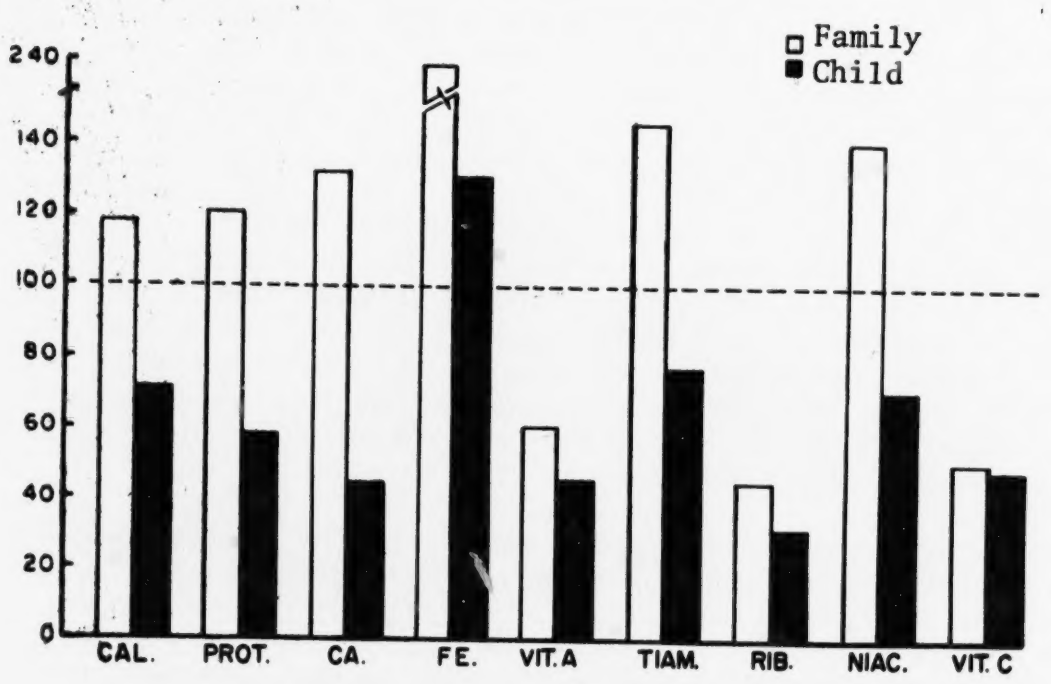
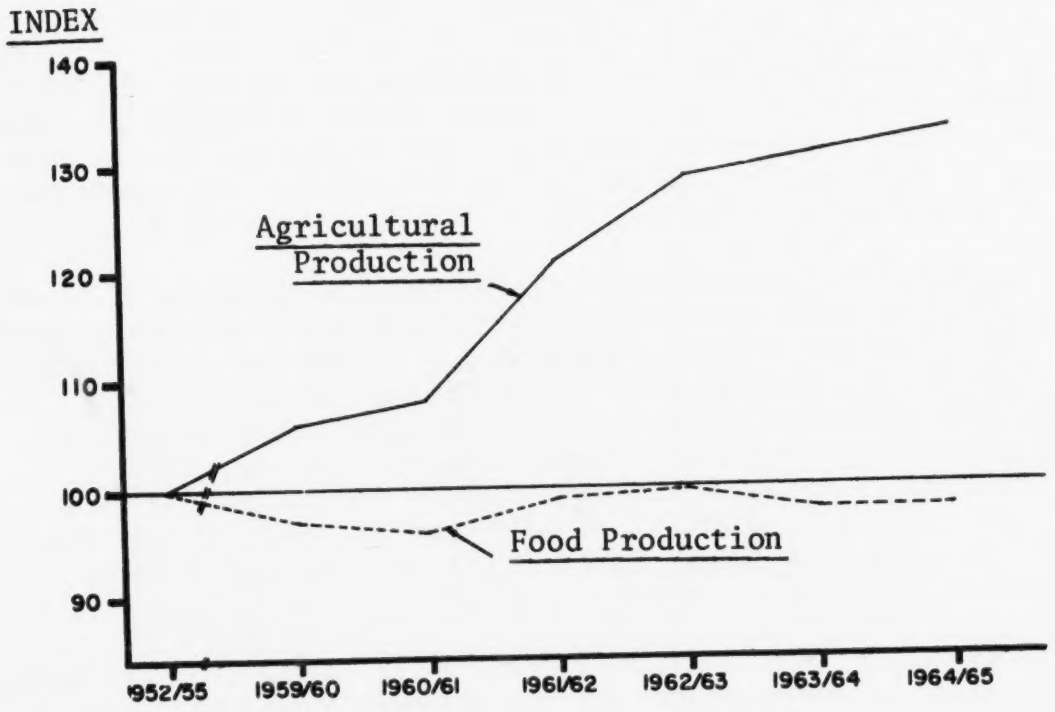


FIGURE 2

INDICES PER CAPITA OF TOTAL AGRICULTURAL PRODUCTION AND OF FOOD PRODUCTION FOR CENTRAL AMERICA AND PANAMA, 1959/60-1964/65
(1952/53-1954/55 = 100)



With reference to the special case of availability of proteins that are especially deficient in qualitative terms, it is obvious that if one assumes the same pattern of production and consumption of foods to satisfy the protein needs of the current population in the area, production should be practically doubled at present,and, by 1975, it should be nearly tripled. Technically this is possible but the data of the last 10 years that have been analyzed here do not indicate that this is the real trend.

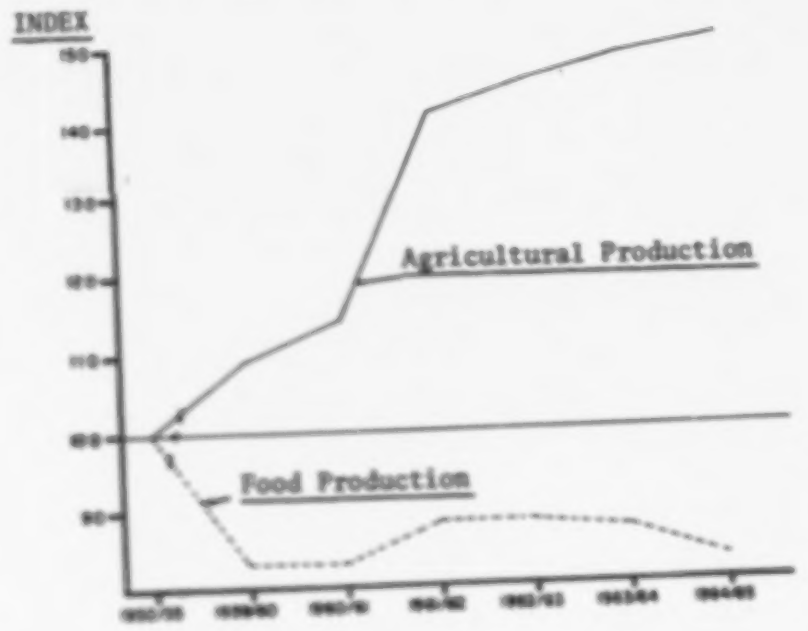
Better utilization of the resources of the area, to increase the raising of animals on a more scientific basis, also offers great possibilities. The limitations are not so much of a technical nature, nor of availability of resources, but rather more of a social, cultural and economic character. Changes in these sectors are generally more slowly achieved; it must be recognized, however, that while these changes do not take place it will be impossible to use adequately the resources of scientific knowledge and the technology available to us.

One easier and quicker means of solving the problem of protein in sufficient quantities to satisfy the needs of present and future populations of this region is the utilization of new sources of protein that are available or potentially available, but that thus far have not been used as much as they should have been for human feeding. As an example, cotton seed is used in the manufacture in INCAPARINA, a mixture of vegetable products of high protein content and low cost, developed by INCAP chiefly for consumption in poor sectors.

The success of this mixture is merely an example of the practicability of the measure; at the present time there are other similar formulas, soundly evaluated, all of which have received the generic name INCAPARINA, and which use different raw materials that are more available or cheaper in other regions, or better adapted to varying eating habits. Some of these other formulas are now also being produced and distributed commercially. The potential in this field constitutes a promise of wide implications.

FIGURE 3

PER CAPITA INDICES OF TOTAL AGRICULTURAL PRODUCTION AND OF FOOD PRODUCTION IN EL SALVADOR 1959/60-1964/65
(1952/53-1954/55 = 100)



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Scientific research and technology are of primary importance if we are to face up to and resolve the serious nutritional problems and needs of present and future populations. No less obvious, this work requires trained personnel of the highest capacity and the support necessary for the development of their work - both factors which are even more inadequate in Central America and Panama.

The health of the people - in the broadest sense defined by the World Health Organization (WHO) as "the physical, mental and social well-being of man," and of course including good nutrition, a fundamental element of health -- is not only one of the basic objectives of development but also indispensable for its realization.

THE HEALTH OF THE PEOPLE

The population of Central America is growing rapidly. This phenomenon, considered by many undesirable and of bad omen, is relatively recent. It is significant that this results from a drop in mortality without the birth rate, always high, being appreciably modified. The knowledge of medicine and techniques of public health are applied with success to the control and treatment of many illnesses that previously cut back the population, with the result that the number of deaths dropped and groups in the reproductive age brackets increased. In contrast, neither the knowledge now available to science in the field of human reproduction, nor the massive application of such knowledge that public health techniques could achieve, have been used for the control of births in Central America.

The growth of the population presents us with a problem not only of the sheer numbers of people and the rates of annual increase, but also of a socio-economic and political character derived from the so-called "revolution of rising expectations".

Perhaps this "revolution" results in the final analysis from the cultural interchange growing out of the progress of communications; it is a manifestation of the process of "acculturation" that, in the case of Central America, makes itself obvious in the gradual adoption of certain patterns, values and material products of western culture and civilization.

Available information concerning health conditions in recent years indicates as the principal causes of sickness and death acute respiratory infections, various forms of gastroenteritis, other parasitic and infectious diseases -- such as measles, whooping cough and tetanus -- and (a significant fact) homicide and accidents. Only in Costa Rica and Honduras do heart diseases occupy a place of importance and, in the first of these countries, malignant tumors should be added.

In all of Central America one observes a high mortality among

children of less than one year; in recent years this has fluctuated between 91 and 50 per thousand born alive. The average for the five Central American countries -- 68.5 per thousand -- is almost three times higher than that of the United States of America during the corresponding period.

Even more striking is the mortality of children from one to four years of age. The averages for 1962 fluctuate between 7.1 and 33.2 per thousand children. The average in the United States for this period was 1.0 per thousand, a difference much greater than the one indicated with respect to mortality of children of less than one year old.

In 1962 there died in Central America 139,666 persons, of whom 67,869 -- almost 50% -- were children of less than five years of age.

Malnutrition is the underlying cause and apparently the cause of the greatest significance, in the high mortality rate of children from one to five years, as has been demonstrated by the INCAP study. It is the clear cause of retardation in growth and development of the poorer Central American children. During nursing the child is protected by the mother's milk; after weaning it is fed with corn meal gruel and other carbohydrates. This diet, exceedingly low in proteins of high biological value and in vitamins, is at the same time insufficient in caloric value and many children in the region literally die of hunger.

Violent injuries -- accidents, attempted homicide and suicides -- have not only been outstandingly common among the patients at dispensaries and hospitals during the last eight years, but also show a tendency to increase.

The population explosion is obvious. One can see its effects in the miserable slums surrounding the principal cities; in the excessive number of rural inhabitants who are being uprooted in their search for work; in the disproportionate number of women in the cities; in the swollen number of children and the large average size of poor families -- six to seven members -- in spite of the high mortality among them.

Certain cultural patterns among the poor of Central America add up to universal components -- insecurity and ignorance -- that maintain the reproductive function of the woman at levels close to those of her biological capacity. The "masculinism" (machismo) of the man, for whom the pregnancy of his woman is a guarantee of submission and loyalty; the lack of social penalty against infidelity of the man, which is characteristic of all social classes; the popular notion, the result of ignorance, that it is fate that determines the number of offspring -- all these are factors that interact in the vicious circle of the explosion of poverty.

In this dark picture some hopes begin to shine. The process of urbanization is speeding up in Central America. It has brought with it the revolution of rising expectations; the desire of the popular masses to possess and enjoy those products of civilization that the city exhibits; a vigorous drive toward economic and educational success, determined by the highly competitive struggle for life in the city and, finally, the hopes of the poor for a better life for their children.

This last phenomenon has made itself evident in the field of public health. Many of the mothers who come to the free clinics in the principal cities ask the physician's aid in limiting the number of their children. They are mothers of the lower classes who have become aware not only of their responsibilities toward the future of their children, but also of the fact that there are means of birth control that are used by women of the middle and upper classes.

Ignorance of these methods, or the inability to use the ones that they already know, are the conditions that force the women of the lower classes to resort to abortion. Induced abortion in mothers who have two, three or four children is an important health problem in Central America.

Present-day medicine is able to give effective help to these mothers, who want to know what women in better socio-economic conditions already know and practice. The physician is at liberty to give this assistance when it is asked for, in conformity with the dictates of his professional conscience

and religion. The state will be obliged to give it, if not as preventive medicine, at least when popular demand transforms it into a political imperative.

The health facilities in Central America, especially those of a medical character, are manifestly insufficient. There are approximately 3,250 practicing physicians, some 2,100 nurses, 7,700 nurses' aides and 850 dentists, and there are 30,000 hospital beds. All these resources are concentrated in the more important cities; extensive regions, some of them densely populated, are without medical services.

More difficult to resolve is the problem of violence. Developed countries have not achieved great progress in this area, a fact that does not remove the obligation to seek remedies for an alarming situation that violence has created in Central America. Perhaps, although it appears irrelevant and even improper to suggest it in this connection, violence is an indication of progress. "The people who live in Renaissances are liable to live with violence."

EDUCATION - BASIC TO CULTURE AND PROGRESS

In the present conditions through which Central America is passing, and accepting economic integration as a goal, it appears especially important to focus on the educational problem as a function of the development of human resources that economic development of the region requires -- to recognize the direct or indirect role education plays in all aspects of development.

The Educational System

As a country evolves, trying to overcome its underdeveloped status, it must constantly raise the educational level of its population; in fact, the potential of its labor force for better productivity depends on its skill and training, as do all the opportunities that society can offer to improve cultural, economic and social conditions. At Central America's present evolutionary stage literacy is not enough; it is imperative to offer opportunities so that, in addition to reading and writing, the people acquire the abilities and skills necessary to a better understanding of the world around them.

Primary education - The population of Central America is growing at an annual rate of 3.2% and it is expected that during the next 10 or 15 years this rate may be even higher. As a result, the demand for educational services is growing, and the problem of overcoming backwardness constantly becomes more pressing. To continue to offer the school age population an opportunity to continue its studies seems a clear obligation. Limited human and financial resources make it necessary to take full advantage of them. This cannot be done without providing the opportunity to study, at the very least, four years at the primary level.

It would be desirable, of course, to offer the student the chance to complete his primary school studies, but this is not always possible. There are still places in Central America where more than 70% of primary schools do not go beyond third grade, with nearly 50% of the total number of

those in school at this level.

Unquestionably the efforts to provide greater opportunities for instruction improved much, in terms of academic level, in the 1950-1960 decade and, to a certain degree, this has also been true of the quality of the instruction (Table No. 6).

Comparing the students who between 1950 and 1960, finished the last grade of primary school (the 6th) and those who completed first grade, one can establish an efficiency index for each 100 scholars, for the region and for each one of the countries that makes it up. The efficiency index for Central America for the period mentioned was 17.1%, with variation by country between 12.1% for Hondu[illegible]s and 22.4% for Costa Rica. It is clear that the cost of education is very high in view of the tremendous rate of drop-outs between the beginning and end of studies at the primary level.

If one divides the children who leave primary school into three categories -- potential illiterates, that is to say those who leave school having only finished first and second grade; limited literates, with third to fifth grade completed; and the really literate, who have gone through primary school, -- one must recognize that for the region as a whole only 19.3% falls into this last category. Fifty-nine and seven-tenths per cent leave school with less than three years of primary education and for want of opportunity to practice their beginning skills in reading and writing rapidly become potential illiterates, thus swelling the group, already large, of those who do not have any education at all.

Secondary education - An examination of secondary education in the region reveals that a very small proportion of the population between 15 and 18 years of age is included in the school system (Table No. 6).

This level of instruction is not required by law in any of the five countries but, in the case of Costa Rica it is free for everyone who desires to go beyond the primary grades.

In the other countries, governments have gone to considerable trouble to develop secondary education and this effort has been one of the principal factors contributing to its surprising growth. However, the prospects for the future are more limited since in almost all the countries the rate of expansion has begun to slow down during the last five to six years, especially in Costa Rica and El Salvador, where the most rapid growth took place between 1950 and 1962.

The academic training of secondary school teachers is limited and constitutes one of the most serious bottlenecks. The percentage of teachers at this level who have university education varies from 45.5% for Costa Rica to 8.6% for Honduras.

Two factors have contributed to this situation: a very rapid growth in the enrollment has forced some use of teachers not adequately prepared in the diverse disciplines; and, without doubt, the lack of incentives and opportunities that would induce a larger number of students to adopt the career of secondary school teaching have been missing.

Merely to offer courses at the university level to prepare teachers in mathematics, physics, chemistry, Spanish and other disciplines is not good enough when there has not been a deliberate policy of incentives to establish these vocations in the field of education.

Higher education - Considering higher education, one notes that the total matriculation for Central America does not represent more than 1% of the population between 18 and 25 years old. Nevertheless this group, during 1950-1960 increased 225%, growing from 0.4% to 0.9%. Of the five countries, only Costa Rica with 2.4% had in 1960 a participation greater than the mean for the region, while Nicaragua enrolled 0.5% of this age in the university.

Despite the limited number of students in each age group, enrollment has grown between 1950 and 1962 at an annual rate of 9.1% for the entire area, El Salvador and Nicaragua showing the greatest gains with a rate of growth of 11.8%. But in recent years a certain decrease in the rate of growth has become obvious, so estimates of future growth are conservative.

TABLE NO. 6

Rates of matriculation by countries, in Central America, according to educational levels in 1950 - 1955 - 1960

Country		Primary, percentage of population (6-13 years)	Secondary, percentage of population (13-18 years)	University, percentage of population (18-25 years)
Central America	1950	0.38	n.d.	0.004
	1955	0.44	0.05	0.006
	1960	0.51	0.07	0.009
Guatemala	1950	0.26	0.03	0.005
	1955	0.30	0.04	0.006
	1960	0.37	0.05	0.008
El Salvador	1950	0.39	n.d.	0.002
	1955	0.52	0.05	0.004
	1960	0.57	0.09	0.007
Honduras	1950	0.36	0.03	0.003
	1955	0.40	0.04	0.004
	1960	0.54	0.06	0.005
Nicaragua	1950	0.44	0.03	0.003
	1955	0.42	0.03	0.005
	1960	0.43	0.06	0.007
Costa Rica	1950	0.67	0.07	0.012
	1955	0.81	0.25	0.016
	1960	0.81	0.19	0.024

n.d. - data unavailable

Source: CSUCA - Project on Human Resources in Central America. (Preliminary Data).

TABLE NO. 7

Economically active population by countries in Central America according to educational levels - 1963

(in thousands of persons)

Country	Total		University		Secondary		Primary		Balance	
	Numbers	Percentages	Numbers	Percentages	Numbers	Percentages	Numbers	Percentages	Numbers	Percentages
Central America	3,747.8	100.0	21.7	0.6	84.3	2.2	363.5	9.8	3,726.5	87.4
Guatemala	1,407.6	100.0	8.0	0.6	20.7	1.4	112.4	7.2	1,266.5	90.8
El Salvador	837.4	100.0	2.9	0.3	17.3	2.1	94.3	11.3	722.9	86.3
Honduras	627.8	100.0	3.0	0.5	13.9	2.2	35.2	5.6	575.7	91.7
Nicaragua	475.0	100.0	2.1	0.4	12.9	2.7	34.0	7.2	426.0	89.7
Costa Rica	400.0	100.0	5.7	1.4	19.6	4.9	89.5	22.4	285.2	71.3

Source: CSUCA - Project on Human Resources in Central America. (Preliminary Data)

It is believed that during the period 1962-1964 the annual growth rate for the entire region was only 6.8%, with marked drops in Costa Rica and El Salvador. In no country is there a probable rate of growth higher than that registered in the period cited (1950-1962). To arrive at a quantitative idea of what may be expected in the years to come, without considering new factors that may change the rate of growth, nor the effect that demand may have on the enrollment, the following figures are presented, expressed in thousands of students:

TABLE NO. 8

Country	1962	1972	1980
Central America	17.3	33.5	57.7
Guatemala	5.9	13.4	25.7
El Salvador	3.0	4.8	7.0
Honduras	1.7	3.5	6.2
Nicaragua	1.9	4.1	7.6
Costa Rica	4.8	7.7	11.2

It is important to know the efficiency with which education is developing at the three levels. However, since in evaluating efficiency at the university level it is impossible to apply the same criteria as to the secondary and primary schools, a simple relationship has been used that makes it possible to reckon a measure of variability of efficiency. This is the relationship between enrollees and graduates. Using the year 1964 as a base, we get a figure of 5.6 for each 100 matriculants for Central America as a whole.

If we divide the enrollees and the graduates of the system according to scientific and non-scientific careers, we find that the production in the scientific area is higher than in the non-scientific. The relationship in the first is 6.9% graduating, while in the second it is 4.7%. The

difference is highly significant and if one analyses it by universities, one observes that in all of them scientific disciplines always exceed the non-scientific and in the case of one university only 1.7% of the non-scientific enrollees secured their diplomas. From the point of view of professional preparation, this relationship is of even greater importance because if it continues to hold at this level, it will not be possible to meet the demands of economic development, in terms of higher education. These simple trends indicate the impossibility of producing a sufficient number of professionals.

The limited information available does not make it possible to consider the academic level of university professors in the region. It can be noted, however, that there is a continuous turnover among them, because the university is not able to offer stable and permanent posts.

Future Requirements

In accordance with estimates by occupation and educational level for the year 1974 the educational needs have been determined, based on economic levels the Central American countries hope to achieve by that year.

Primary education - The labor force of Central America for the year 1963 was made up of 3,747,000 people, of which only 9.7% had completed primary education and one or more years of secondary schooling -- a total of 365,000 people.

The demand for primary education in the year 1974, as it is now estimated, will reach a level of 779,100 people, representing 16.9% of the total labor force of 4,616,300. As a result of these changes, and those that will have to take place at other levels, the remaining group -- which includes those without any education -- will be reduced to 77.4% of the total labor force.

Taking into account death and retirement the number of people with primary education should total 508,900, among whom would be included those who have finished primary school and one

or more years of secondary, but who have not completed this level. This task is, of itself, considerable but not nearly so great as that which will have to be done at the secondary and college levels.

Secondary education - People with a secondary education, including in this definition those graduated by secondary schools along with those who have one or more years of university, but who have not completed the course, amounted in 1963 to 2.2% of the labor force. The demand, in the year 1974, will reach 209,900, which corresponds to 4.5% of the labor force or 125,600 more than were available in 1963.

Making allowance for deaths and retirement, it will be necessary to educate, in the period 1963-1974, a total of 138,300 people including, of course, those at the polytechnic level. If one considers that in the year 1963 there were only 84,300 people with secondary education, the difficulty of the task is obvious. Without doubt the impact of economic integration, reflected in the goals adopted by all the countries, will require changes in the productivity of workers impossible to achieve without profound changes in the educational structure of the work force.

Higher education - To appreciate the magnitude of the change that should be produced in professional training, one need only point out that the demand in the year 1974 will reach 40,600 people or 2.25 times the working force in this group in 1963. Taking into account death and retirement, it will be necessary to train 33,200 professionals. Unless efficiency is improved beyond present standards, the universities of the entire region will train only about 14,000 professionals, which would be 40% of requirements for 1974.

THE CENTRAL AMERICANS:
THEIR ENVIRONMENT

THE CENTRAL AMERICANS

THEIR ENVIRONMENT

THE GEOGRAPHY

Central America, lying from southeast to northwest, is narrower in the southern portion. Its relief is characterized by various systems of mountains, oriented from east to west in the northern part and from southeast to northwest in the southern part and along the Pacific Coast.

The Pacific Coast is relatively unbroken in the northern part where it has the characteristics of an emerging litoral in process of building. Here the greatest irregularity is found in the Gulf of Fonseca.

The southern part of the Pacific Coast, from the frontier between Nicaragua and Costa Rica to Panama, at the northern border of Colombia, is highly irregular and dominated by a series of small bays, gulfs and peninsulas, the largest of which is the Gulf of Panama. This coast presents complex morphological characteristics that show various stages of uplift and submergence in relation to sea level, as well as some drowned valleys such as that of the Tempisque River, that today constitutes the Gulf of Nicoya.

The Atlantic Coast of Central America is more irregular than that of the Pacific and to the north has a large bight, the Gulf of Honduras, that terminates in the Bay of Amatique. Toward the south there is a series of small bays and coastal lagoons, the principal ones being the Laguna de Caratasca, Las Perlas and Chiriqui. In general it has the character of an emerging coast with extensive marine terraces.

The principal factors in determining life zones are the climatic variables. Of special importance are: temperature, including some extremes such as ice or frost, and total precipitation. The annual procession of the rains, or the number of dry months, and relative humidity are also important

factors, but in Central America the life zones maintain a close correlation with temperature and precipitation.

The edaphic factors, frequently subordinated to the climatic, may assume great importance as in the case of swampy areas, zones of high water table or high salinity, areas where the soil is particularly influenced by some characteristic of the parent material, where the texture of the soil has special characteristics, or in cases where there are impermeable surfaces.

Finally, topography plays another modifying role, as to climate and, even more, as to soil.

ECOLOGICAL LIFE ZONES

In Central America the basic tropical zone covers 286,068 km^2, or more than 60% of the land surface, and is found from sea level to an altitude of 400 to 1,000 meters according to the location. The temperature is high, 24°C or more. In general, in the dry zones the tropical belt extends higher, while in the humid zones it is lower since the cloudiness and the high relative humidity tend to reduce the average temperature.

Subdivisions of this zone vary from very dry, with less than 1,000 mm of rain per year, to others that are very humid, with more than 4,000 mm. Although a detailed study has not been made of population distribution in this zone, in general the great majority of people is concentrated in areas of moderate precipitation, usually between 1200 mm to 2,000 mm, where there is a dry season that ranges from four to seven months a year. (Table No. 9)

Actually, there exists an extensive zone -- calculated at about 181,353 km^2 -- with relatively few people and abundant precipitation. In this zone there are few roads and one sees enormous areas of deforestation to make room for shifting agriculture (milpas) and, above all, for grazing.

Many economists and planners note these large areas on the Central American map, pointing out that in them there is a

great future once they have been made healthy and roads have been built.

To what extent is this true?

The fact is there are few reasons for building up optimism. The experience of colonization in other countries with similar life zones shows that only when there is a combination of favorable circumstances, especially good soils and topography, can one expect success with either agriculture or stock raising. But it is rare to encounter large areas with such favorable characteristics. For very good reasons man has generally avoided this zone.

Almost all important crops require good soils and gentle slopes, and these apparently are not common. Under the forest, even in a soil that is apparently poor, situated on a slope, there is a certain degree of fertility as a result of the continuous supply of leaves and other vegetable residues that fall in great quantities under the influence of the hot and humid climate. The soil maintains a good structure, well ventilated thanks to the great abundance of roots. However, it is important to bear in mind that the same climate decomposes organic matter with great rapidity.

When the forest cover of this zone is removed and the soil exposed to the elements there is no comparable restoration of organic material and nutrients. Often a hard cap forms, leaching occurs, or other kinds of deterioration set in, especially erosion and loss of soil. The greater the slope the worse the erosion may be. This is shown, too, by the thousands of square kilometers that have been abandoned by those who tried to cultivate it.

The subtropical or temperate zone usually extends from an altitude of 800 to 1,800 meters above sea level, but tends to vary in both its upper and lower levels. Its total area in Central America is 154,802 km^2, or 32.48% of the total area and it is, therefore, of importance. It is also a heavily populated zone in the sections where rain is not very abundant. On good soils, with sufficient humidity, the

TABLE NO. 9

The life zones of Central America (Panama included), according to a climatic criterion and their area, lakes excluded.

Name of the zone, elevation and annual mean temperature	Classification according to annual precipitation	Extent km²	Extent %
Lower tropical zone or hot lands, up to 800 m, at times to 1,000 m, but usually from 500 to 800 m; 24°C or more	Very dry, less than 1,000 mm	6,230	
	dry, 1,000-2,000 mm	98,485	
	humid, 2,000-4,000 mm	171,843	
	very humid, more than 4,000 mm	9,510	
	TOTAL	286,068	60.3
Subtropical or temperate zone from 800 to 1,800 m, at times from 300 m and even lower in very humid zones; usually 18-24°C, without ice or frost	Dry, less than 1,000 mm	16,623	
	humid, 1,000-2,000 mm	64,685	
	very humid, 2,000-4,000 mm	72,885	
	rainy, 4,000-8,000 mm	812	
	TOTAL	154,802	32.48
Lower montane zone or cold land, 1,800-2,800 m, at times from 1,500 m; ice and frost occur	Dry, less than 1,000 mm	300	
	humid, 1,000-2,000 mm	19,822	
	very humid, 2,000-4,000 mm	12,665	
	rainy, more than 4,000 mm	700	
	TOTAL	33,487	7.03
Alpine zone and sub-alpine or cold climate, above 2,800 m; less than 12°C	Humid, 500-1,000 mm	850	
	very humid, 1,000-2,000 mm	1,336	
	rainy, more than 2,000 mm	traces	
	TOTAL	2,186	0.46
	GRAND TOTAL	476,543	

cultivation of coffee is predominant. Nevertheless, in this zone good soils are not common and rainfall is at times excessive as, for example, on the Caribbean slope in Honduras, Nicaragua, Costa Rica and Panama, which includes large areas.

There the invasion to deforest and prepare the land for agriculture or raising stock, brought in from drier zones, has had catastrophic consequences as a result of the irregular rainfall and the erosion that it produces. The water is often vital for power, irrigation or industrial or domestic consumption in the lower areas. The principal value of the trees or secondary vegetation that one finds today in these very humid areas, is its possible future importance in stabilizing the hydrologic cycle, a fact that must be recognized if further catastrophy is to be avoided.

The poor and gullied soils offer excellent forestry possibilities where they are covered with pines, expecially in Honduras, and in lesser degree in Guatemala and Nicaragua. Here it appears necessary to substitute for the small and inefficient saw-mills industrial complexes capable of managing the forest lands on a sustained yield basis, using to the maximum the many wood products. At first glance, this would not appear to be a popular solution since the small businesses would be replaced by a few large ones. But the latter have a solid economic base and, if necessary, a large cooperative could be founded from many small operations.

In the drier parts of this zone one may see general agriculture and lucrative stock raising in the hands of numerous small farmers, as in Costa Rica and El Salvador. These are some of the life zones marked by the densest population concentrations in all of Central America. The agriculture undoubtedly could be improved with the introduction of new techniques, especially in the use of fertilizers, herbicides, selected seeds, etc. The field is very propitious for agricultural extension as has been demonstrated in many experiments.

The sub-alpine or cold country zone is usually found between

1,800 and 2,800 meters above sea level. On good land with moderate humidity, there are excellent possibilities for agriculture and lucrative milk production without soil deterioration. Because of the large population, especially in Guatemala, there have been invasions of zones with poor soils or exaggerated relief and the results in erosion, siltation and deterioration of the soil have been tragic. Such areas should remain under trees, and careful methods of soil conservation, especially terraces, should be introduced.

Establishment of national parks, wildlife refuges and protection of scenic beauties - In a region where all available land is needed to feed the growing populations, it may seem unrealistic to recognize recreational and aesthetic values and to discuss national parks and recreational areas. From a pragmatic point of view, this is really not the case. The creation of national parks serves many objectives at the same time: promotion of economic benefits from increased tourism; protection of watersheds and soils, and thus hydroelectric potential; recreation for the people; reserves for the flora and fauna; preservation of aesthetic values; and conservation of a genetic reserve of native plants. Many additional values could be mentioned.

CENTRAL AMERICAN SOILS

The very great variation in soils, along with the diversity of climates, is an advantage in production of the most varied crops; but at the same time it presents a serious problem in understanding the soils themselves, with the added defficulty that current knowledge of tropical soils and their management in this part of the world is very limited. Obviously soil studies of the entire region must be completed and, furthermore, there should be a correlation among studies that would permit the preparation of general maps of Central American soils, rather than simply maps of isolated countries or areas.

This is urgent if one considers that to plan the region's agricultural development it is fundamental to have soil maps that range from surveys of underdeveloped areas to semi-detailed and detailed maps of more or less developed agricultural zones and areas soon to be colonized.

A correct selection of soils in relation to their capacity to a great extent determines the success of their use. This principle appears to have been present in the thinking of the inhabitants of Central America from pre-colonial times, when they selected lands for cultivation. They planted in the best soils they could find.

The Spaniards of the colonial epoch did the same thing, but their influence and the increase in population displaced the Indians and peasants onto the steeply sloping soils and their agriculture was converted into the marginal and subsistence, with bad soil use contributing to its deterioration.

Everywhere one sees examples of bad land use. Great farms, flat and with good soils, are used for pasture or covered with scrub. In contrast nearby hills and mountainsides are planted with corn, leaving the soil exposed to erosion and complete deterioration.

There is no doubt that the defective structure of land ownership in Central America has contributed greatly to the for-

mation of this panorama of bad land use. This is even more patent if one considers that, on one hand, there are 620,-650 "sub-family" farms occupying an area of 1,482,370 hectares, while on the other, only 2,195 large "multi-family" farms occupy 33% of the area under exploitation, with 3,919,400 hectares. Thus, the proprietors of large farms do not bother much with correct use of the land and the small farmers are condemned to ruin the soil by the necessity of exploiting it to the maximum.

At present it is said that of the 44 million hectares that make up the surface of Central America, 11,958,000 are in farms. This leaves the impression that there remain great reserves of soil for agriculture and stock raising. Despite this belief, one has only to look at a map of Central America to see that most of the best land has already been converted into farms. A large proportion of that land still covered with trees is badly gullied, and the flat lands are found chiefly in the Atlantic zone, where limitations of climate and soils should be carefully studied before taking a chance on their colonization. There are countries with even more critical situations, such as El Salvador where there is very little unexploited land.

The small farmer (minifundista), situated on the slopes, growing only subsistence crops, with no adequate credit and in many cases not even a sure market for his product, would be unable, even though he understood them, to practice effective soil conservation measures, especially when a change in land use is recommended.

To give an idea of the soil losses in this region, one has only to cite a study made in El Salvador in 1946. It shows that on the 28th of August of that year the Río Lempa was transporting the incredible total of 170,208 metric tons of silt every 24 hours.

These figures, and the unhappy picture that many cultivated areas of Central America present, speak eloquently of the problem that must be confronted to check the advancing destruction of soil and other natural resources.

Unhappily there are not sufficient data demonstrating the harm that erosion does in Central America, data that indicate the relationships among the factors related to erosion, that make it possible to discuss these factors soundly with the farmers and to guide them in their fight against erosion. Because of this lack we have to use baselines and standards from other climates and other soils. These often lead to error, with an understandable loss of confidence on the part of the farmers. The data given above, nevertheless, force one to recognize that vigorous action in defense of soil is necessary; that, so far as possible, the great soil losses should be reduced and that methods of exploitation should be developed for greater and sounder production while maintaining soil fertility. However, we must remember that the bad structure of land distribution, with a multitude of tiny farms under marginal exploitation as well as a large number of tenant-farmers, constitutes one of the most serious obstacles to the development of an effective campaign for conservation of soils.

It is necessary to initiate, as soon as possible, measurements of runoff, loss of soils, and intensity of rainfall, along with their effects on cultivation, in order to make sounder recommendations to the farmers.

Soil deterioration as the result of erosion is advancing at an accelerating rate, constantly reducing the area available for agriculture.

On the soil actually under exploitation yields are very low. Production is not equal to current consumption of the population and, more importantly, between 1950 and 1962 "production intended for internal consumption diminished: the increment per capita of this fraction (of the market) was negative (-0.98%)". Grain production between the three-year periods 1951-1953 and 1959-1961 showed an annual growth rate of 0.9%, while the population increased by 3.2% a year. This means that there must be a tremendous effort to at least double production within the next 20 years, in order to provide a reasonable diet for the Central American population.

TOWARD A BETTER LIFE

As a general rule economists, with praiseworthy exceptions, tend to dehumanize the concept of development, considering it only in terms of productivity. Thus they consider agriculture as a consolidation of agricultural exploitation, whose yields have to be measured and increased. For the sociologist, on the other hand, agriculture is an association of men and women, of families and human groups, who establish a dynamic relationship with the earth to obtain from it, or through its means, the elements necessary for subsistence or the satisfaction of secondary needs. It is not possible to forget the farmer, the worker in the countryside, whose well-being is the primary object of our science.

ECONOMIC DEVELOPMENT

The integration program in Central America aims at free movement of goods, persons and capital; at the creaton of a regional infrastructure and the introduction of changes in demand and production. The process of integration, itself, constitutes a program of development of the economies of the countries that formed the old federation.

There has already been significant progress in the formation of the Common Market and in the creation of a free trade zone and these are needed to permit an optimum establishment of productive factors. Besides, these will serve to destroy the structure of the present Central American economy and to replace it gradually, but as soon as possible, by one oriented toward reciprocal interchange as the determinant of sustained internal growth.

In accordance with this purpose, the constitution of the Common Market has continued advancing, while a regional policy of investment has been moving toward formulation and execution in some strategic sectors. Regional programs have been established, and the states of the region have been accepting them. Such programs include a highway plan, a Central American telecommunication project, and programs of electrical integration.

Recently the countries have decided to formulate their respective economic development plans within a pattern of growing coordination. The Council of Directors of Planning, has been formalized, and has taken steps toward this coordination.

To get an idea of the evolution of the regional interchange growing out of the Common Market, we need only mention that in 1950 trade among the states of the area was only 8.3 million Central American pesos, while toward 1964 it had exceeded 105 million. From 1961 the growth rate of business has been 42% per year, while imports from the rest of the world increased at a rate of 11%.

At the present time 70% of intra-Central American business is based on consumer goods provided by light industry -- food stuffs, textiles, clothing, shoes, soaps, plastics, etc. -- many of which are manufactured with raw materials from abroad. Should the tendency to substitute for imports that has prevailed in recent years continue, one could expect a resultant increase in industrial production of some 80 million Central American pesos annually. Since the national markets are limited by very unequal distribution of income, expansion of production for internal consumption has been horizontal on a regional base (Common Market). For this same reason, such expansion is linked to a general growth of the economy and regional interchange is primarily a business in consumer goods, including those not necessarily essential. In this connection it might be mentioned that agricultural products alone constitute 28% of the total regional interchange, and that their part of the total tends to diminish.

At the present time the region has about 12½ million inhabitants, 8 million of whom are in the rural population. Of the total, those less than 19 years of age represent 47%. On the other hand, the rate of population increase is extremely high, estimated at 3.2% annually during the next decade, based on recent years. Therefore, within this same period the total number of Central Americans will total about 17 million, having grown 4.5 million or 36%. No less important, the work force is growing at a rate of 2.6% while employment grows only by 2.2%.

To take advantage of the potential that the high rate of population growth offers, it is necessary to adopt measures tending to break down the obstacles to development. Otherwise, instead of improving the conditions of human conservation, we would maintain and consolidate the factors that are deteriorating it.

Another characteristic of economic development in Central America is the low income of the population, with the product per capita scarcely 288 pesos. The growth of product has been uneven and between 1950-1964 there was an annual increase of 4.9%, equivalent to the modest rate of 1.7% per person.

In accordance with recently made plans, growth of the Central American economy during the next five years (beginning in 1965) would be at a rate of 6.6% per year, which would mean a growth per capita of 3.4%, raising the product per capita, in 1969, to 339 pesos.

Although such a growth is considered satisfactory in comparison with that achieved earlier, it would still be very low if we consider that after 20 years it would permit the region to achieve an income per capita of only 570 pesos.

One of the major efforts that should be undertaken is to increase and diversify exports to obtain the resources necessary to finance development. The Central American balance of payments tends toward imbalance principally because the traditional export products (coffee, cotton, bananas, cacao, etc.) are in a weak position in relation to external markets. As a result, the plans call for Central America to increase production of wood, meat, shrimps and other primary products despite the fact that as already indicated, there is a grave scarcity of proteins for human consumption.

In any case it will be necessary to adopt measures for more efficient use of income from the external sector. Such measures imply the need of freeing resources, now applied to a certain type of luxury consumption, in such a way that import capacity be used to purchase primary and capital goods necessary to achieve the rate of investment required by development programs.

In effect, the anticipated growth implies the necessity of an increased rate of capital expansion of 10.3% during the next five years, compared to the 7% of the last five years. Both public and private investments play a fundamental part in achieving this target. Public investment is assigned a growth rate of 17%, which is very high compared with the 8.5% reached in the period 1950-1964.

Today more than 64% of the Central American population lives in the countryside. Agriculture provides work for some 2.2 million people upon whom an additional 7.5 million depend, and it has been estimated that unemployment is about

1 million in this sector. In addition, the median income per capita is extremely low, less than 50 pesos a year. This, and the defective distribution of land, are factors that limit the efficiency of agriculture and animal husbandry, and they cause maladjustments in economic and social development. Actually, in this sector one encounters the most backward forms of human life. But the major potential demand in Central America is also concentrated here. Because it is not incorporated into the economic process, it limits all industrial development.

It is impossible to overemphasize the necessity of agrarian reform. Although colonization programs offer a partial solution, their high cost is a limiting factor. In addition, there is a possibility of beginning on the Isthmus a progressive type of agrarian reform that gradually affects pre-determined zones and types of property. It would accumulate experience and combine reform with scientific agriculture. The Joint Planning Mission for Central America has sketched out a program for development of agriculture and cattle raising that recognizes the need to introduce technical improvements, during the next five years, on 20% of the area, or some 2,300,000 hectares accounting for 44% of total agricultural production.

Such education, research and extension programs as now exist need intensification and development of regional coordination to orient them toward common objectives. The Joint Mission has also formulated specific programs of a regional character with respect to grains, stock raising and diversification of exports.

To meet the demand that will grow out of the proposed objectives, it will be necessary, between 1966 and 1969, to increase the production of grains to this extent: corn, 362,000 metric tons; beans, 58,200; rice, 72,600; and sorghum, 109,500. It is important to recognize, however, that there has been a recent tendency for these crops to diminish.

This program requires the total investment of about 140 million Central American pesos, by both the public and private

sectors. Such investment would be applied to construction of storage facilities, creation of a fund to stabilize prices, promotion of cooperatives, agronomic research, training of personnel and building of irrigation works, as well as for the acquisition of equipment.

The stock raising plan has as an objective a quick increase of meat for internal consumption and for export. (At the present time many Central American families eat meat once a year -- on their Saint's day). To achieve this goal an effort will be made during the next four years to improve the 24% of cows suited for breeding. The contemplated action program aims at enlarging the cattle population, milk production, birth rate, and the production of meat per animal killed.

With these objectives in mind, 3.5 million hectares of pasture will be improved and the cattle population will be increased to more than 3.5 million head.

The characteristics of industrial production in Central America also reflect the extent to which it is possible to achieve an increase. During the last 12 years the annual growth rate of this sector has been 6%, increasing its contribution from 12 to 14% of the gross national product. Employment generated by industry comes out to about 10% and this is growing very slowly, at the rate of 1.7% per year.

The low growth rate in the absorption of labor by industry is indicative of the problem confronting the economies in trying to give work to their mounting labor force, despite the dynamic function that it serves. Associated with this is the necessity of increasing productivity as a means of improving the standard of living.

Industrial growth has been fostered by an expansion of internal demand, greater government incentives and expansion of exports. Nevertheless, given the characteristics of the overall economy, it has not been possible to detect an innate dynamic force that would guarantee a permanent and sustained process of growth.

As elaborated by the Joint Mission, it will be necessary for this sector to grow at a rate of 10.2% annually.

Industrial development will require an investment of $678 million pesos, of which $391 million would be for fixed capital, $121 million for building inventories and the remainder for other needed investments.

The programs of public investment are aimed at creating the Central American infrastructure and other external economies that will permit the development of the private sector within the formulated plans. In addition, they aim to create a social infrastructure which will help to wipe out gradually the deficiencies in health, education, housing, etc., and at the same time to reduce the differences that exist from country to country in the emphasis given to these social activities.

Public investments, besides satisfying these requirements, play an important part as a dynamic force in the economy. The total investment by 1969 would grow to $294 million in comparison with the $143 million reached in 1964. The investment for the five year period 1965-1969 would be $1,251 million pesos. According to the economic aims, 51% of these investments would be devoted to economic functions, 33% to creation of the social infrastructure, 12% to productive sectors and 4% to other purposes.

Within these amounts are included the sums required by regional programs, which absorb $224 million or 19% of the total Central American public investment. These programs are, as has been said, the highway network, electrical grids and telecommunications.

Actually, part of this increase should result from control of the annual growth in current government expenses which have been high during recent years. In this way it would be possible to free resources to increase saving, and public expenditures would also be more soundly organized.

It would also be necessary to develop a tax policy designed to avoid a distortion of the use of resources of the region

such as could otherwise appear.

At this point it is important to point out that in the course of the study group's discussions on Human Conservation in Central America, various participants shared the opinion that, for many reasons, the plans of economic development here outlined are too optimistic. Apparently the plans have not recognized possible losses of soil fertility -- of deterioration of the "plant" in which Central America produces its principal articles of food, wood, cotton and other products of the land (including water power, firewood and charcoal) and on which the economy is based.

It is possible that this loss of productivity amounts to as much as 3% annually and, in some cases, perhaps more. It means that many areas -- especially those dedicated to the cultivation of corn -- may become virtually non-productive in 30 to 35 years.

Even many of the soils on the flat lands near the coast, which are now being used for growing cotton, are losing their fertility, although at a slower rate. Unless the soils which lack protection are managed with disc harrowing or construction of terraces, they will suffer the erosion that comes from the downpours common to Central America, even in cases where slopes are no greater than 3% or 5%. The use of artificial fertilizers might conceal this loss temporarily, but it must be remembered that these are not a substitute for top soil.

One of the effects produced by erosion can be readily seen on the milpas, or small shifting cornfields; these are widely cultivated on slopes, where the plants near the top of the hill achieve little growth, while those on the lower part of the slope, where the fertile soil washed down by erosion has accumulated, are almost double in size.

While crops from worn-out lands apparently bring a profit in the market, in reality, because of erosion, this cultivation results in a long-run loss.

Furthermore, given the complications of erosion control, which require changes in the behavior of the peasants,

redistribution of lands, and the many problems that result from an increase in competition of traditional crops in world markets, it is possible that the cost of halting this deterioration of the land will require investment very much greater in agriculture and general education than the economists have estimated.

THE AGRICULTURAL SITUATION IN CENTRAL AMERICA AND PANAMA

The importance of agriculture in the Central American economy is obvious. During 1954-1962 the agricultural sector contributed approximately 37% to the gross national product. These contributions fluctuated between 25.2% for Panama and 47.4% for Honduras. Agricultural products were the almost exclusive source of cash and constituted about 90% of exports. About 75% of the economically active population finds employment in agriculture.

It has been estimated that by 1980, the number engaged in agriculture will have increased 72%. This means that in the absence of industrial employment there will be a growing pressure on the land and, with the current systems of cultivation, the destruction of natural resources could increase. Another result of the growing numbers occupied in agriculture could be a further subdivision of the land already in small tracts.

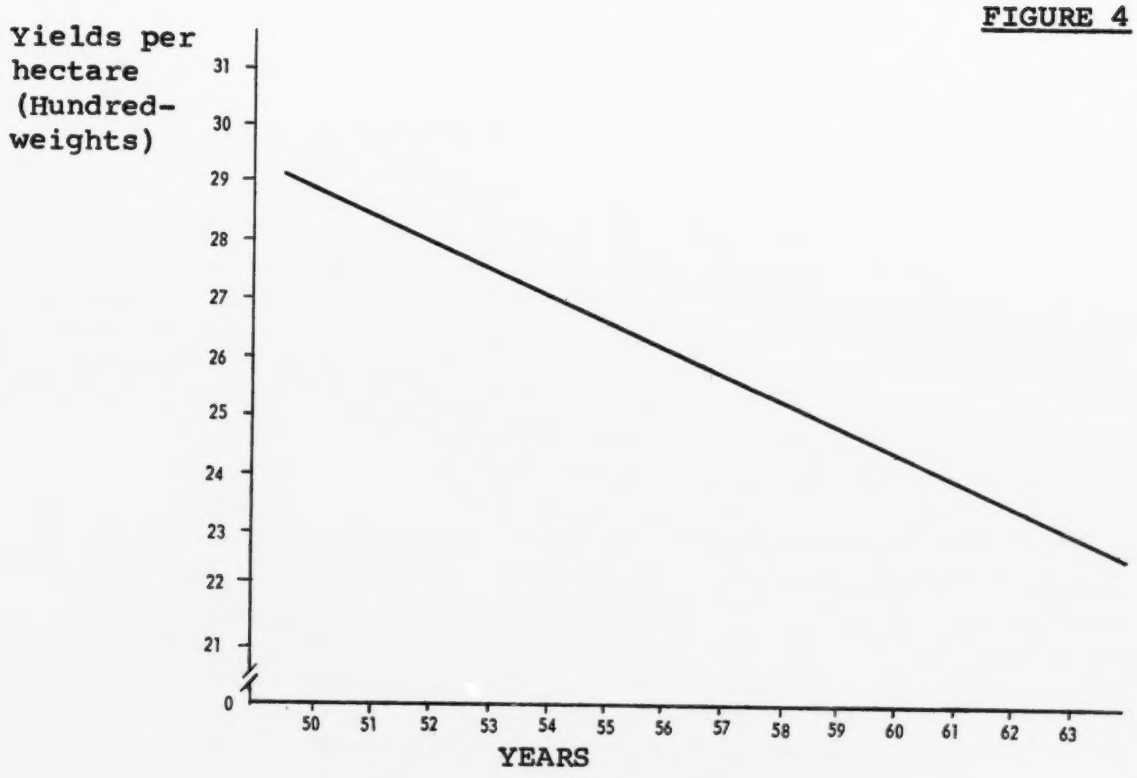
One of the most widely known characteristics of the agricultural sector is the uneven distribution of the land. According to census data of 1955, in the region of Cartago, Costa Rica, 92% of the farms occupied only 28% of the land, while 72% of the land was in 8% of the farms.

Another characteristic of Central American agriculture is that subsistence, or quasi-subsistence agriculture dominates it. Production is mostly in small plots and is chiefly oriented toward supplying food stuffs for a population that participates very little in economic interchanges. Related to this is the backward technology consisting principally of rustic implements and traditional practices that have been repeated over generations of farmers.

Yields tend to diminish or remain almost stationary. It is estimated that in Guatemala yields of corn decreased 28% between the periods 1935-1939 to 1960-1962. Panama registered a 14% reduction in yields of rice and 10% in yields of corn, 1950-1951 to 1963-1964 (Graphs 4 and 5). The

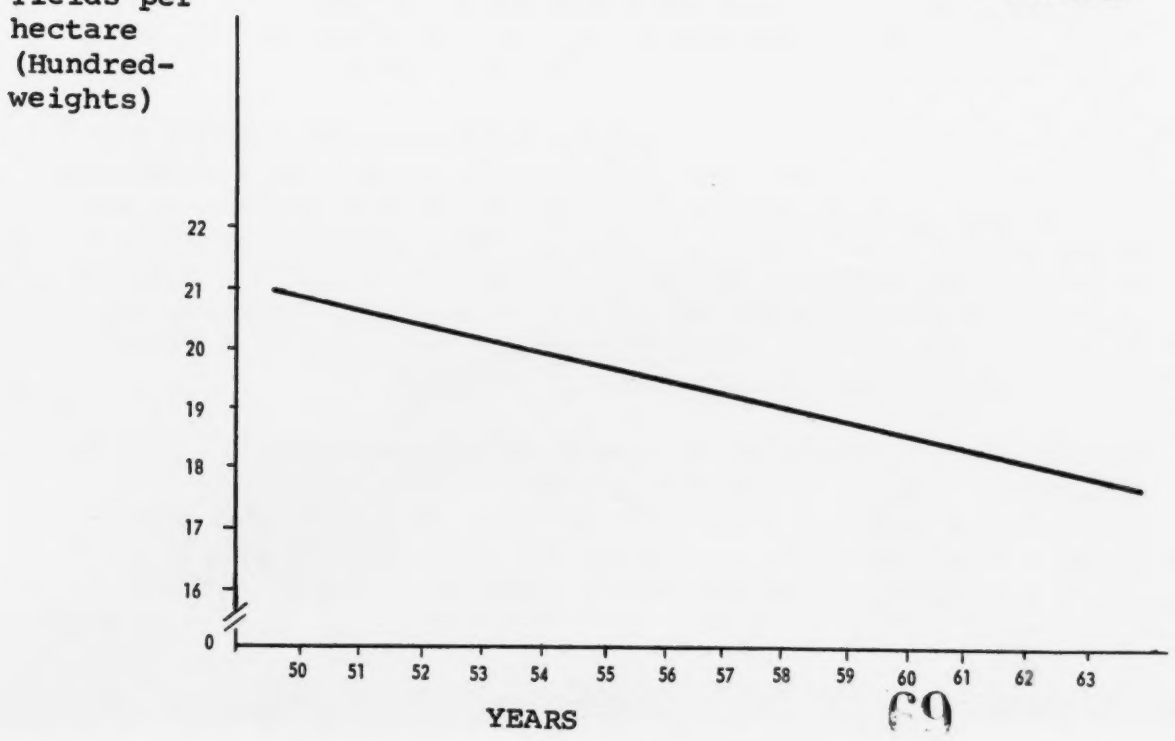
FALLING YIELDS OF MAIZE -- PANAMA
(1950-1951 to 1963-1964)

FIGURE 4



FALLING YIELDS OF RICE -- PANAMA
(1950-1951 to 1963-1964)

FIGURE 5



falling yields can be partly explained as a result of the increasing use of marginal lands because of the growth in the population that lives by farming.

In Costa Rica (according to the Central American University Institute of Economic and Social Research, 1964) most farm families in the Central Plateau receive cash incomes that do not exceed $1,200 annually, including income earned away from the farm. The study shows that in the region of Guanacaste such income is not over $700 (approximately) for two-thirds of the families studied. In El Salvador, 75% of the families have incomes of less than $800. In Guatemala, the same study showed that with the exception of the large plantations, the income of various classes of agricultural producers does not reach $1,400; rather, incomes of some families are so reduced that they do not exceed $100 a year. The situation does not vary greatly for Honduras and Nicaragua, the other countries included in the study. The cash incomes of most families studied did not exceed $400, in some cases reaching the ridiculous figure of only $11 annually! The picture was somewhat different in Nicaragua, but the incomes of most of its farmers were also low. Seventy-six per cent of the families had, so far as was possible to determine, annual incomes of less than $650.

To sum up, the agricultural sector of the Central American Isthmus countries can be described as a complex problem underscored by its importance in the national economy. The problem is reflected in an agriculture of quasi-subsistence and traditional farming practices that are translated into low physical and monetary yields and a skewed distribution of the land.

THE AGRICULTURAL SECTOR AND THE CENTRAL AMERICAN COMMON MARKET

Certain circles throughout the world continue to remark on the progress made in a relatively short time by the Central American countries, in integration of their economy. It should be asked what attention the agricultural sector has had in this praiseworthy and very significant work. In November of 1964, 14 years after the beginning of the integration movement in Central America, the Subcommittee on Agriculture, whose mission is to consider the relationship of agricultural problems to economic integration, held its first meeting!

And there still does not exist an agreement that the economic development of the countries of the areas is seriously limited by the level of development of its agriculture. Implicitly, programs are being carried out under the supposition that industrialization can be a complete success disregarding the agricultural sector, and that this will automatically solve the problem of agriculture. There is no doubt that industry could be a source of jobs for the excess agricultural labor force that continues to grow; but it is important to remember that the cities also have unemployed workers, available at low cost and with more ability in the industrial field, with which the agricultural worker will have to compete. In order to absorb the entire available labor force, agricultural as well as non-agricultural industries would have to operate on a grand scale.

Approximately two-thirds of the population of the Isthmus is rural, with little income, and its basic concern is to obtain food and meet its most urgent needs.

In facing such an agricultural situation it would be well to look at what governments have done to solve the problem. They have not remained indifferent; there is interest in solving the problems and government employees are aware of the seriousness of the situation. Within each country we find Ministries of Agriculture and Cattle Raising, which are responsible for providing most technical assistance to

agricultural producers; extension services; facilities for agricultural credit; experiment stations; statistical offices; institutes of agrarian reform, and so forth. Since all this government machinery exists to look after agricultural problems, how does one explain the backwardness of Central American agriculture? One of the most important limitations on fulfilling their functions is the lack of funds assigned in national budgets (approximately 4%), to meet the needs. The means available to the various organizations and institutions do not even allow their people to get out into the field.

Notwithstanding the limitations on funds and personnel there has been an effort in various countries to increase the production of basic foods such as corn, beans and rice through campaigns in which various government agencies have participated. The campaigns have had as an objective an increase in yields through introduction of improved seeds and cultural practices, such as the application of fertilizers. Participation of the different institutions has been limited to tests of a variety of seeds, selection of the best and production of them in the experimental stations; the concession of credit; guarantees of markets by price support; and technical assistance by extension services. In other cases cooperation has been between the experiment stations and extension services. In general these campaigns have provided valuable experience.

One of the most useful lessons is that an increase in the production of basic foods in the Isthmus is perfectly feasible. The campaigns undertaken indicate that the yields obtained with traditional procedures, of both corn and beans, can be more than doubled. Also it has been possible to obtain valuable data on economic factors and on the attitude of the farmers toward new techniques.

Unofficial information from the campaigns carried out in Guatemala, Costa Rica and Panama to increase the production of grain reveals that important economic reasons influence the farmer's decisions on the use of improved seeds, fertilizers and cultural practices. The new technology means the acquisition of materials that require expenditure of funds he normally does not have. The application of the

new techniques involves a greater use of labor that, if it cannot be provided by the family, must be paid for in some way. In order for a farmer to consider the adoption of improved practices, yields must exceed substantially those normally obtained.

The prices at which he sells his product must be high enough to cover the expenses incurred in adopting the new farming methods, and to leave a profit that will provide an incentive to continue with the new practices on a permanent basis. The belief of the peasants that the price support policy of the government will not last, or that it could change disadvantageously, may be another cause of lack of interest in the new technology.

Probably one of the factors that most influences the farmer against adopti:g new techniques is the greater risk that he runs. With the traditional methods, if there is a bad harvest, he will perhaps suffer hunger or have to go without other things because he cannot sell part of his crop, which will be necessary for consumption by the family. In the case of a bad crop utilizing the new methods, in addition to the consequences already noted, he will be confronted with a cash debt he will not be able to pay. Another factor that seems to influence the enthusiasm of the peasant is the additional work, care and attention that the new practices require. It would appear that the farmer places a higher value on leisure than on an increase in production and income that he might achieve by working more. Despite the importance and usefulness of the educational campaigns, they have not been sustained during a long enough period to give them a national scope. In general they do not last more than a year or two.

FIGURE NO. 10

Productive Capacity of Agricultural Land
Percentage of land by category of potential use
In Central America - 1964

Potential Use Category	Area and per cent of total, in each category represents the amount of land existing in each country					
	Central America	Guatemala	El Salvador	Honduras	Nicaragua	Costa Rica
IA -Intensive use annual crops	8.1% 34,338 km^2	28.0% 9,620 km^2	9.5% 3,260 km^2	25.4% 8,720 km^2	14.6% 5,010 km^2	22.5% 7,728 km^2
IP -Intensive use perennial crops	3.8% 16,477 km^2	38.9% 6,400 km^2	20.6% 3,390 km^2	0.0% -	17.4% 2,875 km^2	23.1% 3,812 km^2
IIA-Extensive use annual crops	2.0% 8,973 km^2	33.9% 3,040 km^2	2.6% 233 km^2	16.7% 1,500 km^2	18.9% 1,695 km^2	27.9% 2,505 km^2
IIP-Extensive use perennial crops	21.1% 88,407 km^2	29.9% 26,425 km^2	0.5% 442 km^2	9.8% 8,663 km^2	45.5% 40,238 km^2	14.3% 12,640 km^2
III-Forestry Use	36.6% 154,902 km^2	20.6% 31,900 km^2	1.1% 1,730 km^2	39.8% 61,640 km^2	26.4% 40,900 km^2	12.1% 18,732 km^2
IIP-CH and III-D Combined uses	5.6% 23,883 km^2	0.0% -	0.0% -	4.3% 1,027 km^2	95.7% 22,856 km^2	0.0% -
IV -Very extensive use	22.8% 96,131 km^2	32.8% 31,525 km^2	12.6% 12,110 km^2	31.4% 30,150 km^2	17.7% 17,066 km^2	5.5% 5,280 km^2

THE PRODUCTIVE CAPACITY OF THE LAND

Despite the fact that Central America has a reserve of land capable of producing more food, its location is unknown, since detailed maps are not available. There exist only soil maps and others indicating actual land use but they are neither precise nor detailed. The same thing may be said about the maps drawn for FAO on land use potential in Central America. As a matter of fact, Guatemala has hardly begun the development of a cadastral map.

Perhaps one of the most useful sources of information on physical resources of the five countries is the Atlas "GIPR" (General Inventory of Physical Resources), that will be published for each country during 1965-1966. This will be an atlas of some 30 to 35 maps or charts on various aspects of physical resources, with a descriptive text included.

Generally speaking, information on the socio-economic resources resulting from human activity is even more fragmentary, out-of-date and less trustworthy than data relative to physical resources.

FAO's study on land use potential was made with the idea of helping agricultural planners to understand and locate the resources of agricultural land in each country. Anticipated yields, based on a hypothetical intermediate level of technology, were used as indicators of potential productivity of crops and livestock.

It is expected that this level could be achieved by a substantial number of middle and small-sized farmers in the next five of ten years if the governmental programs are reinforced to the extent that appears necessary.

It is recognized that such a hope could be too optimistic, given the fact that the present budgets for agriculture are inadequate and taking into account the decided backwardness of peasants in many areas, their resistance to change in agricultural practices -- a fact commented on before in this conference -- and the unsatisfactory systems of land ownership.

In the five countries of Central America, something like 12% of the land (approximately 5,200,000 hectares) is classified as adequate for intensive use and promises high yields when modern production practices are applied.

Two-thirds of this land (8% of the total) is suitable for annual crops without special conservation practices. The remaining third (almost 4% of the total area) is found on slopes, which will require conservation practices, so as to reduce to the minimum loss of soil and water; however, as has been pointed out earlier, it is rare for such practices to be applied.

At first glance one might consider that this is a very serious situation -- only one-eighth of the land adequate for intensive use, and only two-thirds of that capable of being used without special soil conservation practices. But in reality the situation is very favorable. While 12% of the land is suited for high yields, only 9% has been used for annual and perennial crops in recent years. This means that Central America has a reserve of first-class land that would permit the expansion of its farming by one-third (33%)*, on the supposition that for such expansion only the best soils would be used. This suggests also that total agricultural production could increase a great deal more, considering the potentially high yields that can be achieved simply by using the best land. And of course the increase in crops would not be limited to those lands, since at present there is a great expansion of cultivation on land that should not be farmed.

Despite the fact that it is available in a physical sense, much of this good land will require great efforts to incorporate it into commercial agriculture. The "economic unavailability" of land that is physically available is caused primarily by its inaccessibility, its forest cover and, in some cases, the necessity of controlling rivers to prevent

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* 1,750,000 hectares. One might contrast with this the fact that the population is growing by about 400,000 per year.

periodic flooding. The land exists and awaits collective action to bring it into agricultural production. There is not the least doubt that the inadequate socio-economic infrastructure (highways, public services, markets, etc.), the high cost of clearing and preparation of the land, and the lack of an aggressive long range policy by the public sector, constitute the major obstacles to development.

The land picture is more hopeful than the above description would suggest. Approximately a quarter (23%) of the land of Central America is classified as appropriate for intensive use with medium yields where modern production methods are applied.

It is on these lands that one encounters many of the small and middle-sized farms. Furthermore, much subsistence agriculture is now carried out in these areas catalogued as suitable for permanent cultivation. Despite the fact that the greater part (90%) of this type of land has slopes that require soil conservation practices (which, as has been indicated, in reality are very rare) it can produce much more when the traditional methods are replaced by modern methods, however simple these may be. Although normally we should not hope for high yields, these areas respond very favorably to modern technology.

One of the greatest challenges that agriculture technicians must confront in Central America is perhaps the manner of increasing productivity of these 9,738,000 hectares of land suitable for intensive use, without setting very high costs and requiring practices too difficult to teach the peasants. Stock farming and certain perennial crops are the hope of much of this land, but for this type of exploitation it is necessary to develop markets and new facilities for marketing, along with better techniques of increasing production.

Based on its physical characteristics, more than a third (37%) of the land is classified as primarily suited to forestry.

Those in charge of planning agricultural development for the Central American Common Market are contronted by the

realities shown in Figure No. 10. For example, how does one develop agriculture in Honduras, where there exists, as the table shows, a small quantity of Class I and II land suited for intensive use and extensive use for annual and perennial crops, respectively, and a large quantity of Class III and IV land suitable for forestry and a very extensive use? Costa Rica on the other hand, despite being a very small country, has a relatively high percentage of potentially good land. Nevertheless, the circumstances and accessibility of much of it gives pause, both in Honduras and in Costa Rica. To repeat, it is important to remember that land capable of a great increase in production is physically available; the question is how it can be so utilized before serious socio-economic problems develop.

ENERGY RESOURCES

The terms "energy" and "economic development" are closely linked. The history of man could be divided in terms of the amount of energy he has used. Only comparatively recently has it been possible to increase energy used substantially and today rates of growth and development are correlated to determine the future energy needs of a country.

Higher levels of development are accompanied by higher rates of energy consumption. Central America uses, at present, the equivalent of about 4.5 million tons of petroleum, in various forms of primary energy in common use. Approximately 60% of this energy comes from vegetable sources (such as wood and charcoal), 9% from electricity and the remainder from petroleum.

It is natural that as machines are increasingly used to accelerate economic processes, there is greater use of the latter two types of energy. Those derived from petroleum are related to improvement in systems of transport, and to a lesser extent, they are used as fuel to produce more advanced types of energy such as electricity.

In considering the use of energy it is customary to divide it into energy as a "consumer good" and energy as a "production good". The more elaborate and efficient forms such as petroleum and electricity are used more as a means of production, while the other forms are used chiefly as consumer goods, especially the vegetable fuels.

The most noteworthy recent change is that peasants brought into the economic structure tend to use energy derived from petroleum or, especially in Costa Rica, to use electricity instead of cordwood. This creates economic problems in the energy sector. Considerable sums are needed to expand high energy services that demand smaller investments in petroleum than those required for electricity.

Central America, like many other parts of the world, is

limited in availability of better types of energy of a commercial character, especially petroleum and electricity. The greatest available source of fuel is the forests that have long been exploited not only in a very primitive manner but without having as a principal objective the production of economic energy. The elimination of most of the trees that have been cut in Central America has been the result of the need to use the land for agriculture, and not to have wood for fuel. There are some cases in which this has not been true as, for example, the oak forests cut down in Costa Rica to open way for the Pan American Highway. This is very good material to produce charcoal of high quality and is much sought after by the consumer of this type of fuel. On the other hand, all the forests surrounding large towns where there has traditionally been a lack of adequate electric energy have disappeared for the production of cordwood or charcoal.

Of special significance is the fact that, despite the existence of a great need for energy in the region, there is still no technical organization for the exploitation of forests. Only recently completed was a study of exploitation of the forest for the production of charcoal and industrial uses in a steel mill, which is under consideration for Honduras; this will be the first experiment in the development of vegetable fuels.

The cost of transporting cordwood has spawned a preference on the part of those in the business to convert the wood into charcoal, since the transportation is lighter and it offers other advantages.

Perhaps the most interesting factor is that in Central America sites for reservoirs adequate for storage of quantities of water are not very common. On the other hand the problems arising from deforestation and siltation of many of the watersheds that are presently or potentially useful in the production of energy are well known. As a result, the life expectancy of many reservoirs is ephemeral and thus it is difficult in some cases to justify their construction.

There is a very serious conflict over the use of waters --

especially in the western zone of the central plateau of Costa Rica. This has forced the electric companies to recognize that their studies of water resources for power must be made in cooperation with agencies charged with utilization of water for other purposes. A series of multiple use projects that could charge the major share of costs to energy, leaving substantial quantities of water for other uses, especially for irrigation and domestic and industrial purposes, have been delayed. This is undoubtedly one of the programs of greatest importance that Central America could carry out in the near future.

WATER IN CENTRAL AMERICA

It is estimated from studies that with a tripling of the present population in the area, the use of water will increase possibly 10 or 20 times, depending on the growth and economic development of the region. Such an increase will be encountered in all categories: domestic and municipal, agricultural, industrial, energy uses, etc. There is no doubt that technology and administration should be directed toward a common goal in water-use development since they are tools that, properly coordinated, make possible the efficient use of resources for the common good.

The study and understanding of the behavior and quality of surface water resources in Central American countries have generally not been carried out in an organized and systematic form. Rather it appears that the agencies charged with specific programs connected with water (drinking water, irrigation, electricity) have independently and in accordance with their most immediate needs carried out limited studies.

In Central America stream flow has an uneven distribution throughout the year, a fact that underscores the importance of artificial storage.

The conditions and problems of underground water development are very similar in the area. This is favorable in that it will facilitate the organization of a program of integrated research, with many technical and financial advantages. Above all it makes possible better use of available and future human resources, the basis for the success of every activity or program.

The minimum amount of water a person needs for necessities such as drinking and preparation of food is approximately three to four liters per day. The minimum for hygiene and cleanliness is 10 to 15 liters. If a daily bath, calculated at 20 liters a day is added, plus the disposition of sewage, using some 30 to 40 liters a day, the total comes to at least 100 liters for domestic use, when water is piped

into the house, and 40 liters in the countryside for dwellings without inside water.

It is estimated that at present the total demand for water per inhabitant in Central American cities, depending on their size and characteristics, is on the order of 150 to 350 liters a day, a quantity that in the near future could reach 400 to 500 liters. This will depend chiefly on the local level of industrialization.

The development of water resources for irrigation of the Central American area will require the construction of storage reservoirs that will compete with the use of these waters for hydroelectric projects. This implies, also, the protection of the watershed to prevent siltation.

As to water for industrial purposes, it is important to remember that the kind of use largely affects water quality. It is estimated that industrial contamination is much greater than domestic, with the added problem that some industrial wastes are difficult to treat in conventional plants.

The uses of water within lakes or stream beds sometimes conflict with uses that involve removal. Thus, the use of water for discharge and distribution of sewage or agricultural and industrial wastes appreciably reduces or eliminates domestic, industrial and other uses.

It must be remembered that water needs grow every day with growth of population and the hope that all men have of improving their living standard. Every country will be able to carry out an intelligent and useful exploitation of its water resources, a vital part of its development, when it has an inventory and balance sheet showing these resources.

Should one ask if the Central American countries have such information the answer might be that they are familiar in a partial and fragmentary way with some aspects, perhaps only in limited zones or regions, and only to meet the requirements of specific activities or programs.

It would be useful to consider the initiation of a coordina-

ted research program on Central American water resources, perhaps with the collaboration and aid of the Special Fund of the United Nations, which has maintained a great interest in projects directed toward the study of water resources in the area. Among these are the survey of the irrigation potential of the underground waters of Río Grande de San Miguel in El Salvador; the first phase of a study for the use of hydrologic resources for electrification and irrigation in Guatemala; a study of the underground water in the Meseta Central in Costa Rica; and a similar plan for the metropolitan area of San Salvador, with the aim of establishing permanent use of underground waters. The Pan American Sanitary Bureau and the Regional Office of the World Health Organization, have also interested themselves in these and similar programs.

The problems of contamination of surface water by discharge of sewage and agricultural and industrial waste constantly become more serious. Every day the potential use of streams shrinks, especially near small towns that cannot provide themselves complete purification plants, and where there is generally no effective control of water pollution.

In Central America, some countries have only a few decrees or laws referring specifically to limited aspects of water use, while in others the laws are broader. The importance of legislation for protection and better utilization of water resources grows in significance as the population increases and, along with it, general human activities.

The combination of growing populations and increased per capita use for agriculture, industry and household gives long range planning of water conservation and utilization a mounting importance.

URBANIZATION IN CENTRAL AMERICA

The cities of Latin America are growing at a greater rate than in any other part of the world. The population of Lima, for example, swelled from 600,000 inhabitants in 1940 to more than 2 million in 1965; Caracas has tripled its population, which was 350,000 in 1940; Sao Paulo grew from 1 million 20 years ago to 3 million at present and the city of Panama grew from 177,000 in 1940 to 272,000 in 1960. This dramatic change, which results largely from migration from the countryside into the city, creates innumerable new problems and at the same time makes more serious the lack of adequate housing and such services as drinking water, sewage disposal, garbage collection, transportation, lighting, etc. -- in a word, a grave crisis or urban growth.

Mr. Jack H. Vaughn, former Assistant Secretary of State of the United States of America, for Inter-American Affairs, pointed out in June this year (1965) that "economic and social instability grows and multiplies in the slums and the ghettos that exist in the large cities . . . The Alliance for Progress," said the United States official, "has established once and for all the propriety of using international financial resources to improve the conditions of family life in the entire hemisphere through alleviation of the housing problem".

This new progressive policy, announced in Punta del Este, obligated the countries of Latin America to participate in the development of programs leading to improvement of housing. The impact of this new policy has been tremendous. In the last five years both the United States and the Latin American governments have allocated around $600 million dollars, in equal parts (more or less $0.60 annually per capita) for this purpose.*

Urban housing: Two-thirds of the population is lodged in conditions of promiscuity, ill-health and insecurity that

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* During this period, population grew about 30 million.

have been causing high rates of morbidity and a down-grading of the value of the individual and the family.

The principal cause of these evils are the so-called "casas de inquilinato" or "vecindad" with common services, such as water and toilets, and with other poor living conditions, which continue to be built because of the constant demand and the relatively low rents for which they can be offered. As part of this phenomenon one must recognize the distribution of this type of housing in new sections of cities, which means the proliferation of slums that formerly were found only in the older sections.

Current residential construction is predominantly for the wealthier classes, with the result that the demand for housing by the middle and lower income groups who make up 85% of the total population is not being met as it should. The housing shortage grows extraordinarily as a result of the migration from the rural areas to the cities.

The Central American population's small incomes -- due to both low salaries and considerable unemployment -- creates a sub-standard housing market for social groups not able to meet their own housing needs.

Rural housing: The rural population is engaged in farming and grazing activities, on a small scale, and with very low economic levels. Rural housing adjusts itself to this agricultural economy.

The Central American shifting agriculture ("shag" or the "milpa") presents special problems, among them the need for ample space in which to move; rapid exhaustion of cultivated lands; soil erosion intensified by the system of burning; incapacity to sustain dense populations; low yield and inadequate food; diseases that affect both men and cattle; concentration of houses in the forest and their scattering in the savannas.

For many years the need for a policy of redistribution of rural populations and better use of natural resources has been under consideration.

Obviously it would be desirable to channel the forces of the rural population toward scientific and productive farming and thus promote economic and social development. The rural population produces only for its own limited consumption; it does not represent a consumption factor; it is totally disassociated from the national economy; it does not pay taxes, and finally, given the agricultural practices to which it is accustomed, it is wearing out the land.

About a third of the rural population lives in villages with less than 20 inhabitants. It is obvious that one of the roots of this problem of wide scattering is the lack of land owned by farmers, as well as the outworn and inadequate methods used in farming. It is easy to understand that the efforts and investments by the state in schools, health centers, roads, public buildings, potable water, etc., cannot meet the needs created by the growth of rural population, as long as this population remains so diffuse.

In general it is necessary to recognize that lack of adequate housing constitutes one of the most important social and economic problems in Central America. It is worsening with the exodus of the rural populations to the cities, the rapid population growth rate, the low income level and growing costs of building materials, and the shifting of capital, above all of private capital, toward other types of investment.

The Second Housing Census in Panama (Table No. 11) gives a general idea of the lack of housing when it was taken in 1960.

TABLE NO. 11

Dwellings necessary to replace or recondition

Description	Housing Units
TOTAL	115,935
Buildings not intended for dwellings but used for such	2,807
Rustic dwellings (straw, palm leaf, or cane)	38,277
Improvised or "witches houses" dwellings	9,603
Dwellings with high density (3 or more people per room)	65,248
Rooms in warrens	27,602
Apartments	4,146
Individual houses	33,500

The above figures reveal that almost 116,000 living units -- 54% of all occupied houses -- did not possess acceptable standards of habitability and for that reason will have to be rebuilt or restored. If one assumes that a period of 20 years will be sufficient to amortize such a deficit, it will be necessary to construct or rehabilitate a total of 5,800 houses every year.

Another important problem is that of future needs to make up the "attrition deficit" as well as the "demographic deficit". These two types of deficit indicate the number of acceptable habitations it will be necessary to replace as they become unusable as a result of natural wear, and second, the number that will have to be built to meet the demands resulting from demographic growth.

Housing to satisfy social needs, that is to say lodging that is dignified and decent, cannot be achieved except through an understanding of family composition, education, attitudes and tastes, and other levels of life, adjusted to demographic change. A development of housing or urbanization projects must consider these factors if it is to find a sound market and avoid failures resulting from neglect of the natural tastes of the people. Studies completed in Panama show that the modal family size, in both urban and rural areas, is 5.6 people with the lower economic levels having the larger families.

Along with social needs, it must be remembered that economic capacity will also determine, to a very large extent, the quality of housing. So it is important to develop programs leading to an improvement of living conditions for all sectors of the public. Otherwise, there would be a risk of creating housing developments too expensive for the workers, who desire better housing, but who, having small incomes, are only able to rent in a slum or patch up a shack. For this reason it will be necessary to obtain subsidies from the state or improvements of salaries to help raise the standard of living.

The studies, researches and recommendations that have been carried out on the housing problem in the different countries of Latin America all have a common denominator that consists of joint action of the state, through its various agencies, and active participation of private capital.

During recent years, however, thanks to international assistance and mortgages from both public and private sectors, there has been a notable stimulation of construction of adequate housing, especially for middle and working classes in urban areas.

It will be readily appreciated, in view of the foregoing comments on problems of urban development, that the deplorable condition of many existing dwellings, and the simple lack of them, constitute a serious social problem that could become even worse in the future. It is not difficult to affirm, then, that government entities and private institutions

interested in economic and social development of a country, must tackle this problem in a scientific manner and with a well-defined goal to secure higher housing standards, and thereby improve the level of living.

INDUSTRY AND DEVELOPMENT

It should never be forgotten that the funds required for planning and execution of development programs come directly or indirectly from industry -- including agriculture -- through its materials, products, payrolls, dividends and taxes. It is not yet known to what extent industry should be expanded to carry the burden of the future; neither is it known when or how industry can initiate an effective planning process. It is recognized that industry is not created primarily to carry out a social responsibility but rather to produce profits. Nevertheless, once a given industry has been created, its social responsibilities begin and continue to grow.

Industry can be defined as applied science -- constantly in a state of change -- the purpose of which is to elaborate its products and services to satisfy the real and imaginary needs of society.

Central American industry has grown rapidly during recent years, thanks to scientific development, improvements in means of communication and transport, greater demand by people with growing capacities for consumption and better conditions for investment of capital.

But what can be done to enlarge industry three or four times beyond its current stage of development?

Economists, sociologists and other specialists are required to help industrial leaders decide what needs to be done and to carry it out.

Nevertheless, this mutual effort will be productive only when there is an understanding of the basic factors that determine a businessman's decision. He is a realist. He must secure capital, meet payrolls, contribute taxes, turn over dividends to stockholders, and produce articles that can be sold. Industry can produce whatever is necessary if it is given an opportunity that is financially attractive. When the interest of the private businessman coincides with

the interest of the nation, the result is rapid progress.

In other words, to establish an incentive for capital, security is necessary -- security as to the acquisition of materials, availability of labor, and political and social stability. Capital is available from national as well as foreign sources, but it insists on this security.

Some national capital is now abroad. But it would return if security existed. There are also people of lower economic levels who would be disposed to invest small sums if there were adequate financial institutions or banks. But capital flows easily only when the credit base is sufficiently large and financial institutions are adjusted to local reality. Stock exchanges also attract capital and facilitate the flow of money.

Capital seeks favorable tax conditions and these may exist not only where taxes are low, but also relatively high, so long as the government uses them well to improve social and economic conditions, which at the same time leads to greater security and profit.

With the passage of time capital becomes more cautious. It demands facts, studies of economic feasibility, guarantees against expropriation, protection against inflation and the certainty that profits may be distributed to stockholders, no matter where they may be.

Industry produces only that which it can sell with profit and recognizes that all that it produces comes from the earth and its resources; therefore, it has a fundamental interest in conservation. It knows that to the consumer it matters little whether the raw material comes from his own country or from abroad. Industry is slave of the consumer and in order to be successful must produce what the consumer wants. If it does so, salaries are paid to employees and money circulates.

Industry itself is a consumer. It consumes raw materials, some of which may be wastes of neighboring industries.

Industry should produce what it can locally, to avoid the flight of profits. But at the same time it should export to produce profits to buy what it cannot make.

Industry serves him who does not have what he wants. Today many markets are not economically feasible for certain Central American producers because of complexities in the buying and selling procedures. The European tendency to trade preferentially with its old African colonies is forcing Central America to increase its business with the United States and Canada. Customs and the cost of transportation are becoming sizeable problems. Should Central America sell to Russia and Communist China in order to survive? Industry should think practically and realistically about its future policies, since export markets are more important than local markets.

Planning should be realistic since it must take account of politics, geopolitics, national desires and objectives, and foreign political and economic forces.

Industry participation in the preparation of national and regional programs contributes greatly to their success. Since such programs can succeed only with the help of human and money factors, planning should recognize the motivating forces of self-interest.

It would be very desirable for the Central American industrial development program to consider modern business methods, which call for economic feasibility studies on a large scale before investments are made.

A leader in the technology of modern administration, the well-known Peter F. Drucker, has said it is hopeless to think that Latin America can convert itself into an industrial society without political and social dislocation.

Planning will have to consider how to condition people for changes and how to induce them to alter their attitudes and customs. Agricultural science knows how to triple the production of corn in Guatemala, but how does one convince the people that they should put this knowledge to use? In other

countries industry is learning to use the science of cultural anthropology. Should we include, in planning, the necessity of motivating people?

This area and its problems are no greater than others that have been studied successfully by applying research techniques; one could cite as examples the overall plans adopted by Iran and Nigeria. A first practical step could be the preparation of a development plan for the economy of Central America that would be less complicated and less sophisticated than those for other regions.

Of the total population of Latin America, from 60% to 70% lives in rural areas (in Central America, 83%). The majority of these people are dedicated to producing their own food, a fact that limits a rapid change towards industrialization. A mature money economy does not exist and there is also a constant migration of surplus population from the country to the principal cities. On one hand this migration aggravates the miserable conditions in the slums and ghettos that now exist, and on the other the increase in unemployment is becoming a socio-political problem of first magnitude.

The up-and-down cycles in the coffee, sugar, cacao, rubber and other agricultural and cattle markets tend to create confusion that throws national objectives off the track and gives rise to trivial disputes between nations with respect to their just and fair share of the "traditional markets".

Diversification of sources of income is a slow process. The power groups made up of the intellectuals, the rich, the politicans and the military -- waste not only important capital but also energy, in the eternal struggle to dominate a country's political scene. The natural leaders consider unacceptable the possible risk of losing life and property or -- what is worse for some -- their prestige and dignity. As a result, demagogues are often permitted to arise, provided the interests of the different groups are not affected.

An encouraging awakening of the middle class -- if one may

call it that -- is becoming evident, and little by little it is making its strength felt. Its youngest members, who contribute most to the population growth, show a social consciousness that is greater and more promising than that of the leaders.

The number of citizens who pay taxes grows day by day, as does the number becoming home-owners, although not so rapidly as would seem desirable. Every day more and more younger citizens express their disapproval of abuses and make themselves heard. The professional politicians have to take account of the rise of this group with a social consience; furthermore, they should take note of the fact that the workers are more conscious of their power and will not let themselves be guided only by the worn-out demagogy of other days.

Even when it lacks the accepted fundamental bases of industry -- such as petroleum, steel, coal and sources of cheap and accessible energy -- the area is exploiting what it has and continuing with submarine explorations in its territorial waters. Also, it does what it can with its few mineral resources, although in this field there is room for improvement.

The Central American Common Market is gaining value rapidly and encounters stubborn opposition only from those industries that are inefficient, marginal or parasitic. Despite the fact that the specter of devaluation and inflation always exists, it has been possible to avoid this by following a wise and tenacious capitalist fiscal policy.

MAN IN THE ECOSYSTEM

Life in Central America sustained itself hundreds of thousands of years before the arrival of man through a combination of processes involving the geology, climate, fauna and flora -- processes that in some cases are only beginning to be understood -- there slowly developed an ecosystem, or total environment, in dynamic equilibrium. Erosion of the soil was reduced to a natural minimum, considering the forces to which such a young landscape is exposed; the hydrologic cycle stabilized itself insofar as the environment permitted; and the utilization of solar energy and circulation of the nutrient substances of the land, water and air, by means of plants and animals, evolved into a homeostatic system.

Man's date of arrival in this part of the world is unknown (this does not refer to either Columbus or Ericson) but, apparently, human populations remained fairly small almost until the dawn of the Christian era, when the first cities began to develop.

During some thousands of years before this, there was widespread, although not intensive, disturbance of the ecosystem because of hunting and, presumably, the use of fire. It is probable that, except in very limited areas, populations were of low density. At the time of the Spanish invasion it is estimated there were six people per square kilometer in El Salvador. This is 5% of current Salvadorian density, or 20% of the current density of the Central American population as a whole.

The capacity of millions of hectares to provide nutrients to plants, and to maintain the hydrologic cycle, has been gradually reduced as a result of destruction of the plant cover and disintegration of the plant-animal associations. This has caused erosion of soil and loss of absorbent capacity of the land.

Along with a five-fold increase in population has come a greater technological control by man over his environment.

This has helped to increase productivity, at least temporarily. But the internal combustion engine also has enormously increased man's destructive capacity, and man-made poisons are exterminating not only destructive species of animals but large numbers of other species useful to agriculture. These acts may have profound influences that are still far from understood.

A new and powerful cultural factor, the "money economy", has substituted symbols (colones, lempiras, dollars, etc.) for physical processes and realities. These symbols and the benefits they represent -- short term gains, high export prices, loans and grants from the Agency for International Development and others -- frequently hide what is actually taking place in the Central American ecosystem.

Fertility has decreased for thousands of square kilometers, chiefly from soil erosion, a loss made more serious by the fact that methods of measuring fertility are still so primitive it will take years to evaluate it. Springs are disappearing and rivers and reservoirs are silting badly, at the same time that new and costly water sources are being developed. Forests, potential sources of fibers and possibly food, are not protected against fire. Natural controls of insect plagues, such as bird protection, are not notable in budgets.

During this total process new technologies such as more productive monocultures have been developed, without weighing their relationships with the ecosystem as a whole. As a result long range aims are often not considered.

The Central American Common Market countries today need (and do not have) 30 billion calories a day, some to be converted into proteins; if populations continue growing, in 25 years they will need approximately 65 billion calories. If health is to be improved and industrialization made effective, the water needs will grow at an even higher rate. As a result of the rapidly increasing population, an environment that is by nature inhospitable for dense populations, is steadily made less hospitable by abuse of the land.

If the current rate of population growth is not sharply reduced, it will be necessary to find quantities of money much greater than those estimated by the planners, if only to maintain living standards of the moment -- standards that for most of the people are barely tolerable. Only a much more realistic attack on the problem by the leaders can avoid catastrophe: more malnutrition and even famine, susceptibility to social upheavals, and greater permanent deterioration of the environment.

Of all the resources, the scarcest -- and the one for which there is no substitute -- is time.

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